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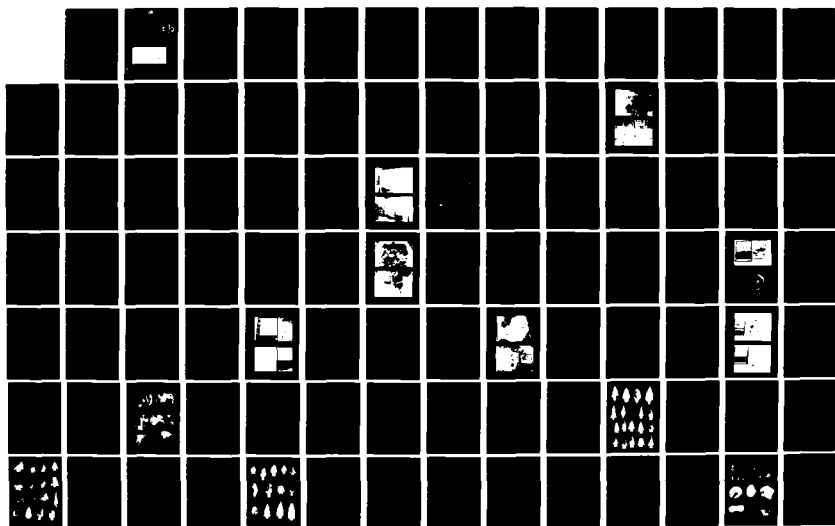
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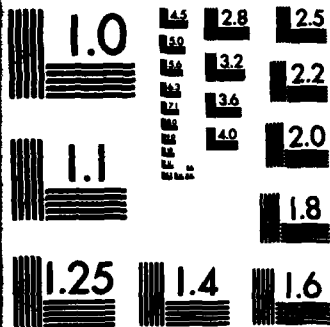
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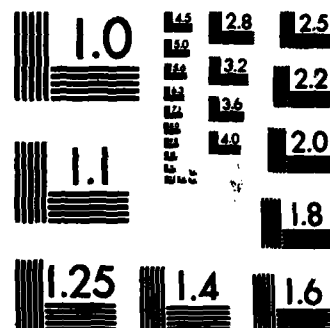
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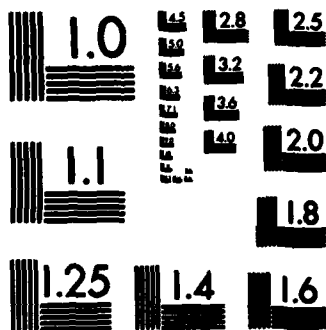




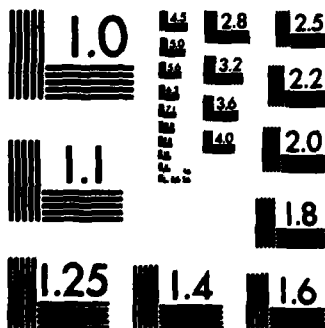
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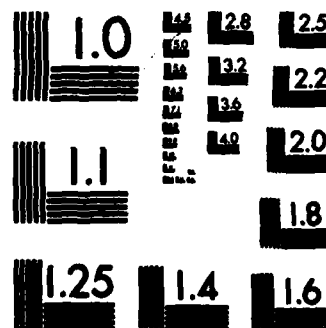
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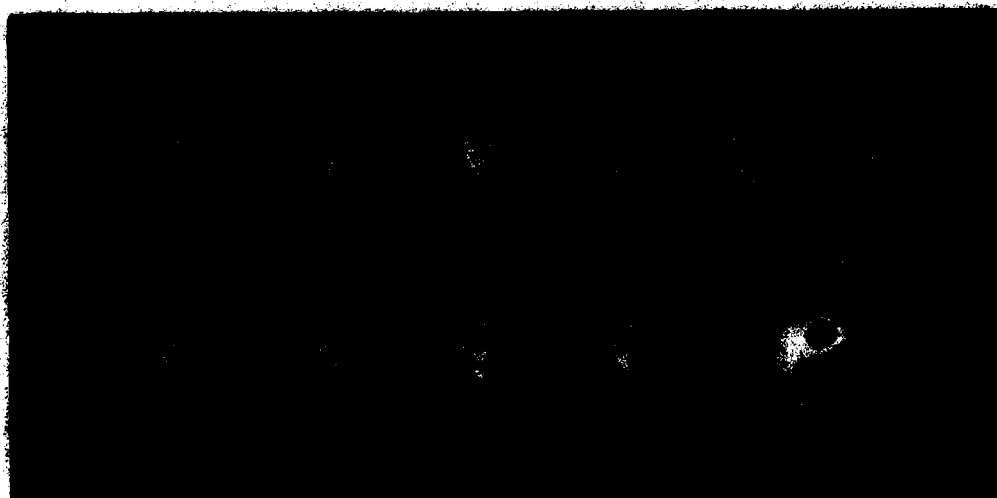
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THE ARCHAEOLOGY OF THE

BUG HILL SITE (34Pu-116):

PUSHMATAHA COUNTY, OKLAHOMA

Rain Vehik



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THE ARCHAEOLOGY OF THE BUG HILL SITE (34PU-116):  
PUSHMATAHA COUNTY, OKLAHOMA

By

Rain Vehik

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## ACKNOWLEDGEMENTS

The Bug Hill site (34Pu-116) was excavated as part of a contract (DACW56-78-C-0212) between the University of Oklahoma and U.S. Army Corps of Engineers, Tulsa District during the fall and early winter of 1979. The excavation program was handled very capably by Michael B. Mayo. Stan Gough served as the field assistant, and deserves a note of special recognition for a job well done. The same is true for Jeff Homburg and C.A. "Nub" Terry who did much more than their job requirements, and without whom the excavation program would have been slowed drastically. Marilee Irvine did an excellent job as field laboratory manager, field crew member, and analyzing the ceramics from the site. I would especially like to acknowledge other crew members who remained with the project until excavations at the site were completed. These include: Zelma Briggs, Donna Clay, Diane Payne, Patsy Stinson, and Cathy Wright. Jeane Goode of Tuskahoma provided our meals.

Kay Zahrai was in charge of the Norman laboratory and Debbie Farris was responsible for overall management of the project as well as some typing and proof reading. Archie Hood capably handled the analysis of human burials; Mike Mayo and Peggy Flynn the analysis of bone tools; Sheila Bobalik, Archie Hood, and Mike Mayo identified most of the faunal remains; and Peggy Flynn assisted in preparing the chipped stone descriptions. Fren Swenson prepared all of the photographs and Mary Goodman did her usual excellent job on line graphics included in the report. Suzanne Svec volunteered some time in the field and was also involved in some of the laboratory analyses. More detailed analyses were conducted by Beta Analytic, Inc. (radiocarbon dating), Stephen Hall, North Texas State University (palynology and gastropod identification), and the Oklahoma State University (soils analysis). A large number of people worked either at the site or in the laboratory, and for those not mentioned by name I would like to express my gratitude.

A special word of recognition is extended to Susan Vehik and Peggy Flynn. Both gave up their spring vacation time and spent many nights typing, editing, proof reading, and preparing a draft copy of this report. Without their capable, uncompensated assistance the report would not have been completed when it was.

# THE ARCHAEOLOGY OF THE BUG HILL SITE (34Pu-116): PUSHMATAHA COUNTY, OKLAHOMA

Rain Vehik

## ABSTRACT

→ Archaeological investigations were conducted at the Bug Hill site (34Pu-116) as part of the Phase II mitigation program at Clayton Lake in southeast Oklahoma for the Tulsa District, U.S. Army Corps of Engineers under Contract Number DACW56-78-C-0212. The site will be inundated upon completion of the lake in the Jackfork Valley. The Bug Hill site is one of two large, dark midden mounds discovered during 1979 in the project area. Currently, these sites represent the southernmost distribution of dark midden mounds in eastern Oklahoma. Very similar sites occur along Fourche Maline Creek in Latimer and LeFlore counties.

Investigations at the Bug Hill site consisted of the manual excavation of 13 2 m x 2 m, four 1 m x 1 m squares, and mechanical excavation of three backhoe trenches. Preservation of cultural deposits in the center of the site was extremely good, even though rodent disturbance and other natural processes affected their distribution in some cases. On the average, these deposits had a depth of 170-180 cm. Toward the edges of the accretional mound, the deposits became shallower and preservation was poor. ←

Based on the recovered cultural material and a series of 18 radiocarbon dates, four distinct cultural components are present. The primary activities occurring throughout the prehistoric occupation of the site appear to be the manufacture and maintenance of lithic implements and the acquisition and processing of faunal and floral materials. Even though the basal 50 cm of deposits are undated, the earliest occupation is between 1605 B.C. and 289 B.C. Stratigraphically, this occupation is believed to occur between 60-180 cm. The dates and associated material argue for a Wister phase occupation during the Late Archaic period. Of interest, during this period are the occurrence of marine shell beads and pendants and several flexed burials. A rolled copper bead may also be associated with this period. Several occupational surfaces are defined on the basis of unaligned postmolds and ash/clay concentrations. As a result, the site is believed to have been used as a base camp during the Wister phase.

The subsequent occupation of the site is associated with the Fourche Maline phase and dates between A.D. 278 and A.D. 617. This occupation is also believed to represent a base camp with hunting being a primary activity. Similar artifact styles between the Wister and Fourche Maline phases make it difficult to distinguish them, but the Fourche Maline phase has several small point categories and the first ceramics at the site are noted during this period. One flexed burial, an ash/clay concentration, a rock feature, and a single marine shell pendant and bead in addition to other artifact categories are associated with this phase.

A third prehistoric occupation occurring in the upper 20 cm and possibly 30 cm of the site is associated with the early Caddoan period. A radiocarbon determination of A.D. 859 dates this occupation. Beside the date, late varieties of ceramics and small projectile points argue for this placement. Hunting seems to be the primary activity and the presence of rock concentrations suggest processing activities. Even though different kinds of activities were conducted, the lack of structural features indicates the site was used as a special purpose camp during this period.

A variety of historic material including ceramics, glass, metal fragments, and bullet casings may relate to a historic (possibly Choctaw) use of the site. These materials were confined to the upper levels of the site.

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# I

## INTRODUCTION

This report details the results of excavations and analyses of the Bug Hill site (34Pu-116). The site was excavated as part of Phase II investigations at the proposed Clayton Lake in Pushmataha County, Oklahoma. The site was substituted in Contract Number DACW56-78-C-0212 for the Lee Kirkes site (34Lt-32), and a contract modification was necessary to complete the excavations. Prior to the modification, eight 2 m x 2 m squares and three backhoe trenches had been excavated. The modification required that either 20 2 m x 2 m squares or an equivalent thereof be excavated. Additional waterscreen samples would also be collected. The remainder of the requirements are the same as those set forth in the Scope of Work for Phase II investigations. These consisted of: 1) the employment of standard excavation techniques based on stratigraphic or arbitrary levels; 2) the collection of chronometric, pollen, soil, and faunal data; 3) mapping the site and the recovery of artifacts in the most precise manner possible; 4) all artifacts would be washed, cataloged, and analyzed; and 5) the site is to be restored as closely as possible to conditions prior to the initiation of excavations. Additional requirements included a written report to be completed, and all materials and records to be curated in the State Depository at the Stovall Museum, University of Oklahoma.

## PROJECT DESCRIPTION

Upon completion, Clayton Lake will inundate 5666 ha (14,000 acres) in the northern part of Pushmataha, southern part of Latimer, and a small part of eastern Pittsburg counties in southeast Oklahoma. At least 30 prehistoric sites will be directly impacted by the lake. Mitigation of 11 of these resources has been funded by the U.S. Army Corps of Engineers, Tulsa District. The Archaeological Research and Management Center (ARMC) has conducted this work during 1978 and 1979 (Vehik and Galm 1979; Vehik 1982), and the Bug Hill site represents the final site to be excavated during Phase II.

## SYNOPSIS OF PREVIOUS RESEARCH IN THE CLAYTON LAKE AREA

Archaeological investigations at Clayton Lake were started in 1972 with an archaeological survey which recorded 31 prehistoric

resources (Neal 1972). Follow-up work, in the form of a testing program, was done in 1976 when two additional sites were recorded (Bobalik 1977). Another survey, conducted in December 1976-January 1977, recorded six more sites (Drass 1977: 595-657). The 1976 testing program involved limited test and posthole excavations at 38 sites. Based on this information, five cultural periods (Archaic, Woodland, early Caddoan, late Caddoan, and historic) were posited (Bobalik 1977: 555-574; 1978). From the information provided by Bobalik (1977: 557-559, Table 281), the Jackfork Valley was most intensively utilized during the Late Archaic, Woodland, and early Caddoan periods. Potential Paleo-Indian and Early Archaic components are indicated primarily by surface materials (Bobalik 1977: 560). However, these remains could also have been utilized by later populations as is indicated at the George C. Davis site (Shafer 1973: 183-185).

The work by Neal (1972) and Bobalik (1977; 1978) does not indicate any ceremonial centers, villages, or small year-round habitation sites in the Jackfork Valley. Two categories of sites were postulated: long- or short-term base camps and special purpose (extraction) camps (Bobalik 1977: 42; 1978: 3-7). Several activities including lithic reduction, hunting, vegetal resource processing, storage, and the processing of undetermined resources were hypothesized (Bobalik 1977: 563).

In 1978, the U.S. Army Corps of Engineers initiated Phase I investigations at Clayton Lake. This mitigation program was based on earlier investigations (Bobalik 1977; 1978). The Phase I program concentrated on eight sites and refined the chronological scheme provided by Bobalik (1977). Well dated Woodland components related to the Fourche Maline phase and an early Caddoan hamlet (consisting of two structures) were defined, and several undated Archaic, Woodland, and Caddoan components were excavated (Vehik and Galm 1979). Table 1 provides a listing of radiometric dates obtained during 1978-1979.

The 1979 excavations (Phase II) included work at six sites, three of which were initially excavated in 1978. This work delineated the lack of additional structures at 34Pu-74, but defined a Late Archaic component, confirmed an early Caddoan occupation across the site, and further documented a late Caddoan or protohistoric component. At 34Pu-105, the earliest occupation is a Woodland component (Fourche Maline phase). Subsequent occupation during the early Caddoan period is represented by a structure-like feature. A possible structure is also associated with a Woodland component at 34Pu-111. A later occupation of the site during the early Caddoan period is posited on the basis of ceramics, projectile points, and a radiocarbon date which may be out of context. Two newly excavated sites, 34Pu-100 and 34Pu-102, have radiometrically dated components. Two C-14 dates at 34Pu-100 suggest a Woodland component which is overlain by an undated early Caddoan occupation. Finally, at 34Pu-102, a Late Archaic component has been radiocarbon dated. This component is also associated with a multiple burial. An undated Woodland component overlies the Late

Table 1. Radiometric dates from archaeological sites at Clayton Lake.

Code	Site	Context	Radiocarbon years B.P. (5730)	Calendar estimate	Cultural Historical tradition
Averaged	34Pu-74	Structure 1	-	A.D. 1221 $\pm$ 34	early Caddoan
OU-1648	34Pu-74	Structure 1	Archaeomagnetic	A.D. 1200	early Caddoan
OU-1647	34Pu-74	Structure 2	Archaeomagnetic	A.D. 1185	early Caddoan
Averaged	34Pu-74	Structure 2	-	A.D. 1166 $\pm$ 39	early Caddoan
WSU-2355	34Pu-105	Feature 79-14	824 $\pm$ 90	A.D. 1126	early Caddoan
UGA-1519	34Pu-105	Feature 76-1	850 $\pm$ 75	A.D. 1100	early Caddoan
OU-1646	34Pu-74	Structure 2	Archaeomagnetic	A.D. 1070	early Caddoan
WSU-2354	34Pu-105	Feature 79-11	937 $\pm$ 90	A.D. 1013	early Caddoan
BETA-1207 <sup>1</sup>	34Pu-111	Feature 79-7	973 $\pm$ 60	A.D. 977	early Caddoan
BETA-1206	34Pu-111	Feature 79-2	1267 $\pm$ 65	A.D. 683	Woodland
UGA-2545	34Pu-105	Stratum III	1334 $\pm$ 55	A.D. 616	Woodland
UGA-2685	34Pu-111	Feature 78-1	1349 $\pm$ 75	A.D. 601	Woodland
UGA-2684	34Pu-111	Feature 78-1	1370 $\pm$ 80	A.D. 580	Woodland
TX-3710	34Pu-100	Feature 79-3	1617 $\pm$ 70	A.D. 380	Woodland
UGA-2544	34Pu-105	Strata II-III	1648 $\pm$ 55	A.D. 302	Woodland
WSU-2353	34Pu-105	Stratum IV	1648 $\pm$ 85	A.D. 302	Woodland
TX-3711	34Pu-100	Feature 79-3	1689 $\pm$ 50	A.D. 261	Woodland
SMU-703	34Pu-105	Stratum III	1707 $\pm$ 54	A.D. 243	Woodland
TX-3712	34Pu-102	Stratum II	3234 $\pm$ 60	1284 B.C.	Late Archaic
TX-3713	34Pu-102	Stratum IV	3677 $\pm$ 70	1727 B.C.	Late Archaic
TX-3714 <sup>2</sup>	34Pu-102	-	4192 $\pm$ 90	2242 B.C.	Noncultural

<sup>1</sup>Sample may be contaminated.

<sup>2</sup>Sample dates charcoal along creek bank.

Archaic occupation. In addition, almost all of the sites investigated in 1978-1979 have a thin mantle of historic material which reflect late 19th century or early 20th century activities.

In summary, the archaeological investigations have succeeded in defining several well dated components from the Late Archaic, Woodland, and early Caddoan periods. It is likely that the Late Archaic and Woodland components are related to the Wister and Fourche Maline phases respectively (Galm and Flynn 1978; Galm 1978b). The early Caddoan components are probably related to the Harlan and Spiro phases (Brown 1971).

## II

### BACKGROUND INFORMATION

#### THE SITE

The Bug Hill site (34Pu-116) was located during the summer of 1979 and excavations were started in August and completed by the beginning of December. The site is approximately 150 m west of Jackfork Creek and 400 m northeast of the confluence of Jackfork and North Jackfork creeks (Figure 1). An intermittent stream is adjacent to the west side of the site, and numerous intermittent creeks are to the north. The Wheeler Lee site (34Pu-102) is approximately 800 m east of 34Pu-116. The Dink site (34Pu-114), which is similar in composition to the Bug Hill site, is approximately 2200 m west-southwest at the confluence of Jackfork and Maxwell creeks (Figure 1).

There is little evidence of similar sites (dark midden mounds) other than the Dink site in the project area. Recently, a third possible dark midden mound was reported to the Corps of Engineers. This site is east of the Bug Hill site. These sites occur in an area where Wolf, Middle, and Flagpole mountains converge to form a narrow valley, and may be situated in this area because prehistoric populations could easily exploit a variety of ecological zones. Another possible reason for their placement at the narrow end of Jackfork Valley is that the mountains may form a natural defense barrier. There is strong evidence from similar sites along the Fourche Maline Creek in the Wister Lake vicinity of warfare and/or violence (Powell and Rogers 1980; Galm 1978a). Human burials with projectile points either implanted in bone or in the chest cavity have been reported from these sites.

The Bug Hill site is composed of very dark, homogeneous soils. It measures 56 m x 60 m and is at least 1.8 m deep in the east-central part of the site. The site was cultivated in the 1940's or 1950's and the plowzone has an average depth of 20 cm. The plowzone may cover the entire site and sheet erosion and bioturbation has caused it to spread out from the edges of the site. There is also evidence of intensive rodent burrowing, and the site was overgrown with dense brush, briars, and medium to large oak trees.

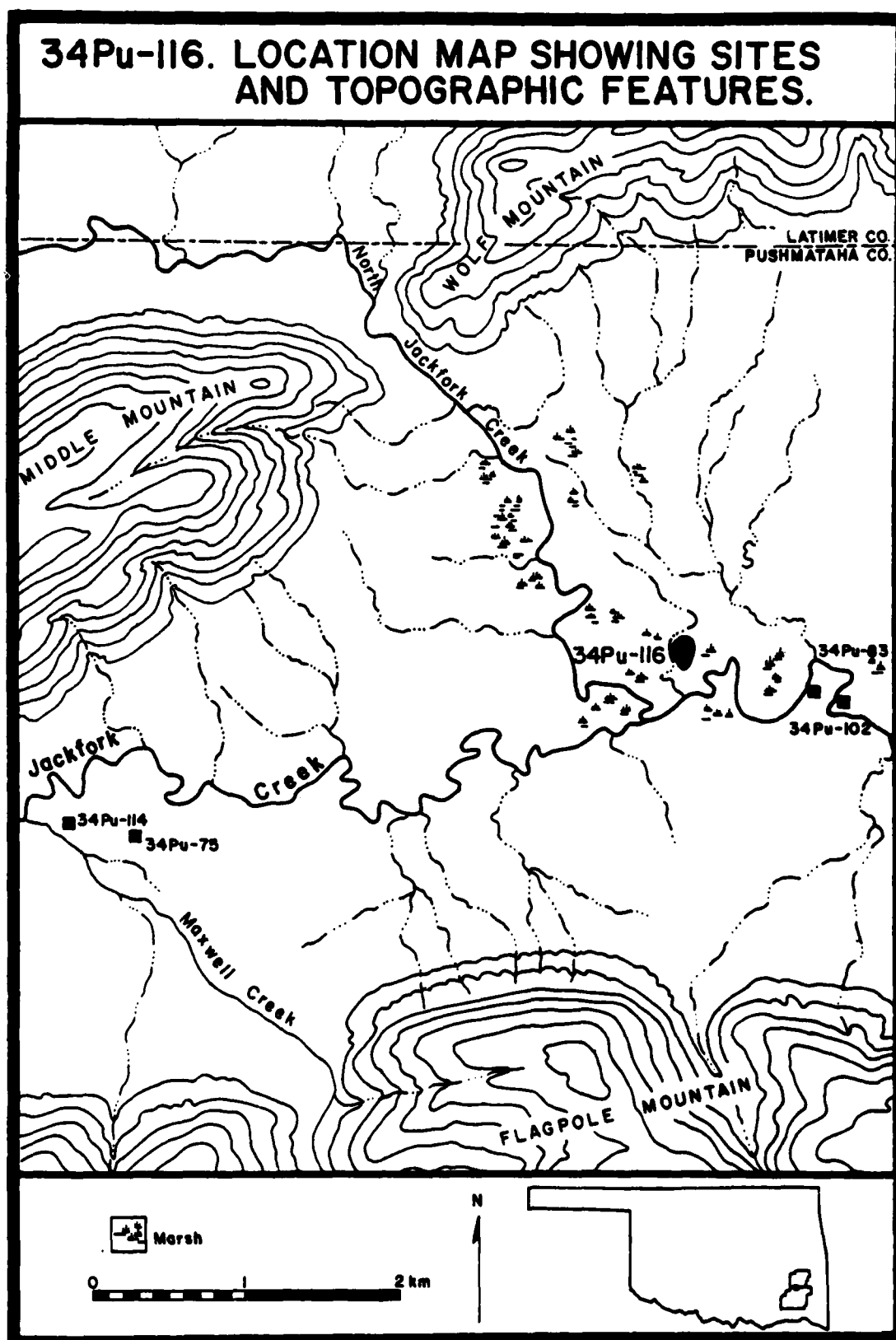


Figure 1. Location of the Bug Hill site (34Pu-116).

The Bug Hill site will be inundated upon completion of the lake, and the Dink site is in the flood pool and will be periodically inundated. The Bug Hill site was excavated because of its relative lack of disturbance and it was on property definitely owned by the Corps of Engineers. A historic sawmill used to be along the south edge of the Dink site and there is evidence of numerous potholes in the site. In fact, when the site was discovered, the landowner was actively mining it for artifacts and would not allow us access to the site.

## ENVIRONMENTAL SETTING

The Bug Hill site is in an interior valley of the Ouachita Mountains Province (Figure 2 a-b). The primary vegetation is a deciduous oak-hickory association (Bruner 1931: 131-142). Based on Federal Land Survey field notes and plat maps, Bobalik (1977: 9-13) developed a model of pre-1900 vegetation. This model indicates that the site area is within the lowland forest zone consisting of predominantly oak-elm-hickory-ash forests on floodplains and low terraces. Other common trees are pine, walnut, sycamore, dogwood, hackberry, and mulberry. A prairie zone is approximately 1 km from the site and upland forests are within 2 km. Vegetation resources within the project area include at least 146 species of plants and trees which could be of potential economic importance for prehistoric inhabitants of the area (Vehik 1979a: 16-23, Table 2).

Faunal resources are also abundant with at least 49 mammal species being represented. Over half (59%) prefer woodland habitats (Vehik 1979a: 24-27, Table 3). In addition, 224 species of birds, a variety of amphibian and reptilian species, and aquatic vertebrates and invertebrates are common in the project area.

This portion of the Ouachita Mountains is characterized by a continental type of climate which tends to be semihumid to humid, but moderated by southerly winds from the Gulf of Mexico (Means 1969: 9). The average annual precipitation is 115.3 cm with the majority falling during spring and fall seasons. Winters tend to be short and mild while summers are long and hot and occasionally result in drought conditions. The present growing season lasts about 180 days with the first killing frost in November and the last in April.

Soils in this region belong to the order Ultisols and the great group Hapludults (Gray and Rooszitalab 1976: 28-30). Soils surrounding the site are classified as Pushmataha loam (Bain and Watterson 1979). This is a deep, nearly level soil on floodplains of rivers and creeks, and a soil profile has been described approximately two miles (3.2 km) northeast of the site:

A11--0 to 12 inches, dark brown (10YR 4/3) loam; few fine distinct light gray mottles; weak fine and medium granular structure; friable; common fine and medium roots inside peds; medium acid; gradual smooth boundary.

A12--12 to 22 inches; brown (10YR 5/3) loam; few fine distinct light gray mottles; weak fine and medium granular structure; friable; common fine and medium roots inside peds; thin strata of fine sandy loam and silt loam; medium acid; gradual smooth boundary.

C1--22 to 38 inches; brown (10YR 5/3) loam; common fine and medium yellowish brown (10YR 5/6) and light gray (10YR 7/1) mottles; massive; friable; common fine and medium roots inside peds; thin strata of fine sandy loam and silt loam; medium acid; gradual smooth boundary.

C2--38 to 60 inches; light gray (10YR 7/2) silt loam; common fine and medium distinct yellowish brown (10YR 5/6) mottles; massive; friable; few fine roots inside peds; thin strata of loam and fine sandy loam; medium acid (Bain and Watterson 1979: 52).

Pushmataha loam soils provide good habitats for grasses and legumes, herbaceous plants, hardwood trees, and coniferous plants. They are also conducive habitats for openland wildlife (bobwhite quail, meadowlark, field sparrow, cottontail rabbit, and red fox) and woodland wildlife including wild turkey, woodcock, thrushes, woodpeckers, squirrels, gray fox, raccoon, deer, and bear. Their potential for supporting wetland wildlife including ducks, geese, herons, shore birds, mink, and beaver is fair (Bain and Watterson 1979: 124-127, Table 15).

## RESEARCH DESIGN

Archaeological investigations in the Clayton Lake area during 1978 (Phase I) and 1979 (Phase II) were oriented to interpret settlement/subsistence patterns and to integrate these with adjacent areas. With this in mind, the overall research design involved the development of an adequate chronology and determining the nature, significance, function, and type of site occupations.

The survey work (Neal 1972; Drass 1977) and excavation programs (Bobalik 1977, 1978; Vehik and Galm 1979; Vehik 1982) have revealed substantial prehistoric occupations extending from the Archaic through early and possibly late Caddoan periods in the Clayton Lake area. These sites, for the most part, are multicomponent and consisted of special purpose (extractive) sites and base camps.

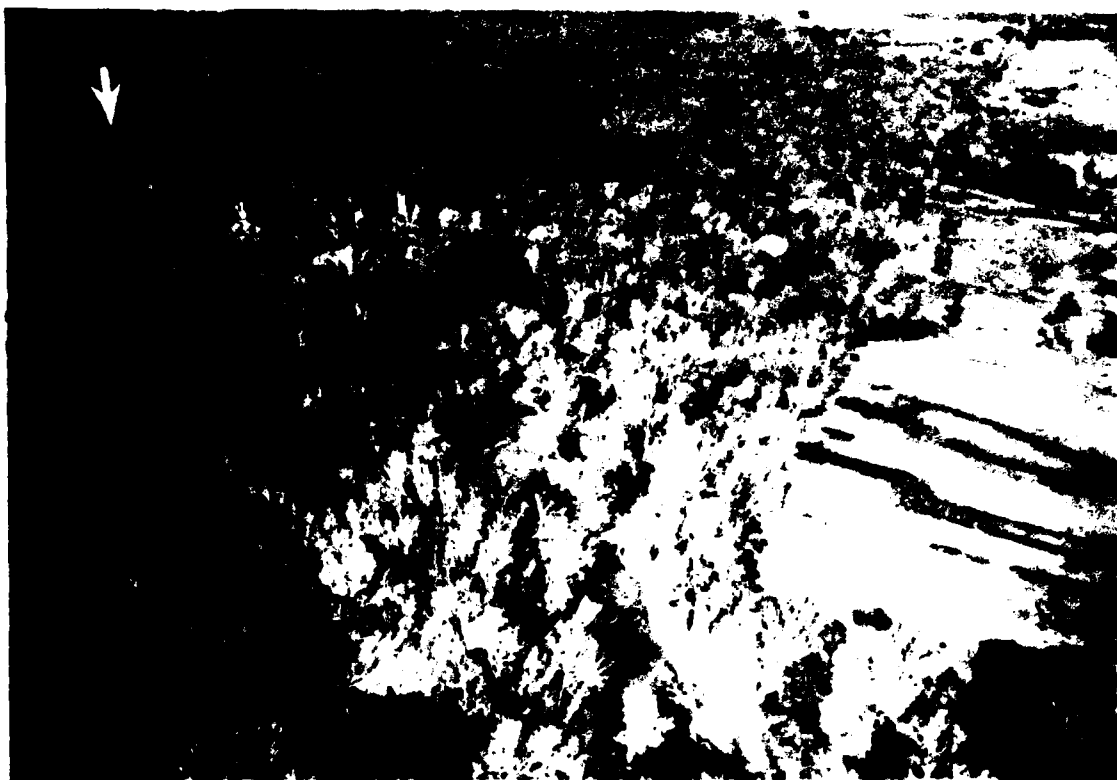
The location of the Bug Hill site and its similarity to dark, accretional mound sites (midden mounds) in the Fourche Maline Creek Valley (Wister Lake area) provided an opportunity to study a totally different type of site in the Jackfork Valley. A large number of midden mounds in the Wister Lake region were excavated by WPA crews prior to World War II. Other sites, such as the Scott site, were investigated later (Bell 1953). More recently, a resurvey of the Wister Lake shoreline relocated numerous sites (Mayo 1975) and the Wister Lake Archaeological Project tested several midden mounds and excavated portions of the Scott, Wann, and Curtis Lake sites (Galm 1978a, 1978b; Galm and Flynn 1978). Another midden site, McCutchan-McLaughlin, has been excavated and various reports published (Wyckoff 1976; Wyckoff and Woody 1977; Powell and Rogers 1980; Clark 1980). Based on these data as well as Bell and Baerreis' (1951) summary statement on the Fourche Maline focus and Bell's (1980a) reanalysis which introduces the Wister and Fourche Maline phases, it is believed that the Bug Hill site will provide data that is absent from many other sites in the Clayton Lake area. The following questions were considered upon excavation of the site:

1) One of the major goals of the Clayton Archaeological Project is to identify archaeological units based on defined artifact assemblages and to place them in a chronological framework. The nature of the Bug Hill site suggests that information necessary to identify archaeological units and to develop a chronological framework will be available. As indicated earlier, a number of well dated components and phases have been defined at other sites in the Jackfork Valley, but it is assumed that the Bug Hill site will provide a localized sequence of these developments and how they changed through time. Radiometric data from sites in the Wister Valley suggest a break between A.D. 1 and A.D. 600. Obtaining a sequence of dates from the Bug Hill site will provide information whether this hiatus occurs in the Jackfork Valley.

2) Data from Wister Valley midden sites as well as sites in the Jackfork Valley indicate occupations by several cultural traditions beginning as early as the Middle Archaic and/or Late Archaic (Wister phase) continuing through the Fourche Maline phase, the Caddoan period, and terminating during the late prehistoric period. Is there evidence for similar occupations at the Bug Hill site? Is culture change apparent in chipped stone technology, pottery, faunal utilization, types of features, and activities during occupation of the site? Also data from Wister Valley sites suggest that trade for nonlocal materials (copper and marine shell beads) started during the Late Archaic and continued into more recent periods. Is this evident at the Bug Hill site, and in what direction was the trade being conducted?

3) Sites in the Clayton Lake area as well as Wister Valley have usually been identified as base camps or special purpose sites with a variety of posited activities (Bobalik 1977; Vehik and Galm 1979; Galm and Flynn 1978). These include hunting, lithic manufacture and

- Figure 2. a: Aerial photograph showing the location of the Bug Hill site (34Pu-116). The arrow in the upper left marks the location of the site. Jackfork Creek is in the foreground.
- b: General site photograph in late fall. Flagpole Mountain is in the background. Crew, left to right, backrow: Cathy Wright, Donna Clay, Patsy Stinson. Middle row: Zelma Briggs, Diane Payne, Jeff Homburg, Stan Gough. Front row: C.A. "Nub" Terry and Marilee Irvine.



A



B

maintenance, vegetal procurement and processing, storage, and construction activities. Will similar activities be reflected at the Bug Hill site?

Base camps are represented either as long or short term occupations used on a seasonal or multiseasonal basis. They serve as a base of operations from which other activities may be initiated. Material culture remains should have greater densities and reflect more generalized activities. Evidence of lithic reduction at base camps, especially those close to lithic resources, should be well represented and there should be more evidence of maintenance. It is also thought that stationary facilities such as hearths and structures with attendant features will be present. Also burials could be expected at base camps as well as refuse reflecting daily activities of the site's inhabitants.

Special purpose (extractive) sites or occupations are considered to be the result of short-term activity, usually consisting of a single dominant task (Gibson 1974: 72). Secondary activities could occur, but in a much more restricted sense. The tool inventory should reflect the primary activity. Brown, Bell, and Wyckoff (1978: 177-178) suggest that extractive sites ... "lack evidence of permanent, roofed structures, and exhibit evidence of seasonal or transient use characterized by a limited set of artifacts".

4) Is there evidence in the deposits at the Bug Hill site to suggest ecological or climatic change in the Jackfork Valley? Technically, these changes should be reflected in pollen, soils, macrobotanical remains, vertebrate fauna, pelycopods, and gastropods.

5) Midden sites in the Wister Valley are characterized by numerous human burials. At several sites, there is evidence of violence (projectile points made of nonlocal materials imbedded in bone or in the chest cavity), and pathological disorders are present in a large part of the skeletal remains. If burials are encountered at the Bug Hill site, will they also display evidence of violence and will similar pathological disorders be observed?

#### EXCAVATION METHODS

The excavation strategies implemented at the Bug Hill site are similar to those employed at other sites in the Clayton Lake area. The basic difference is that the placement of excavation units was not determined by a random sampling technique. The primary reason for this was a lack of time, and the site is a well defined entity which does not cover an extremely large area. Also excavation strategies at similar sites in the Wister Valley (Galm 1978b; Galm and Flynn 1978) have indicated that in order to adequately assess the nature of this type of site, large contiguous areas need to be excavated.

A north-south and east-west horizontal grid was imposed over the site. All measurements were taken from an arbitrary datum point designated ON-OE on the south edge of the site. A secondary datum was established at N30-W0. Two meter square excavation units were used, and they are referred to by their southeast corner. Thus the first square, 16 m north of the east-west base line with the southeast corner on the north-south base line is designated N16-W0. Thirteen 2 m x 2 m squares, four 1 m x 1 m squares, and three backhoe trenches of varying length and depth were excavated (Figure 3). This amount of excavated area exceeded the equivalent of 20 2 m x 2 m squares required by the Corps of Engineers.

The backhoe trenches were excavated mechanically since they were used to obtain stratigraphic information about deposits along the north, south, and east edges of the site. Individual squares were excavated with conventional hand tools such as shovels and trowels. Ten centimeter arbitrary levels were used throughout the excavations except for a 1 m x 1 m square in the southeast corner of N28-E2. This square was excavated in 5 cm arbitrary levels as a control block, and all of the soils were waterscreened. In addition, a 5 liter soil sample from each level in the control block was collected for flotation. Other materials were also waterscreened. The Scope of Work also required 10 liter samples of soils from N48-W14 and N27-E44 to be waterscreened. These samples were collected from each 10 cm arbitrary level except for Level 1 (0-10 cm) in N48-W14 which was excavated before the implementation of this procedure. All of the waterscreen material was washed through 1/16-inch mesh hardware cloth. The remainder of the cultural deposits were screened through 1/8-inch mesh hardware cloth.

A concentrated effort was made to locate artifacts *in situ*. When an artifact was located, its horizontal coordinates were plotted using distances north and west of the square's south and east base lines. Vertical measurements of each *in situ* artifact were taken from the surface of the southeast corner of each square. A code system was used to denote artifacts. Code 1 refers to artifacts found *in situ*, Code 2 denotes artifacts within a quadrant and level of a square, Code 3 refers to artifacts recovered during screening which are associated with a level and square, Code 4 designates artifacts within a square but not assigned to a particular level, and Code 5 denotes surface finds. Artifacts, including recognizable lithic tools, were placed in individual plastic bags with identifying tags in order to limit field and lab-induced edge damage.

Features were encountered throughout the deposits and were initially excavated by removing surrounding sediments. In many cases, soil samples were saved for waterscreening and/or flotation analysis. Once a feature was exposed it was photographed and a horizontal plan was drawn. Features such as postmolds, pits, and a few ash/clay concentrations were cross sectioned to obtain vertical profiles. Stratigraphic profiles were obtained from each excavation unit, soil samples were collected from N28-E12 and N50-E29, and a pollen profile was taken from the central part of the north wall in N28-E12.

### 34 Pu-II6. THE BUG HILL SITE, CONTOUR MAP AND EXCAVATION PLAN.

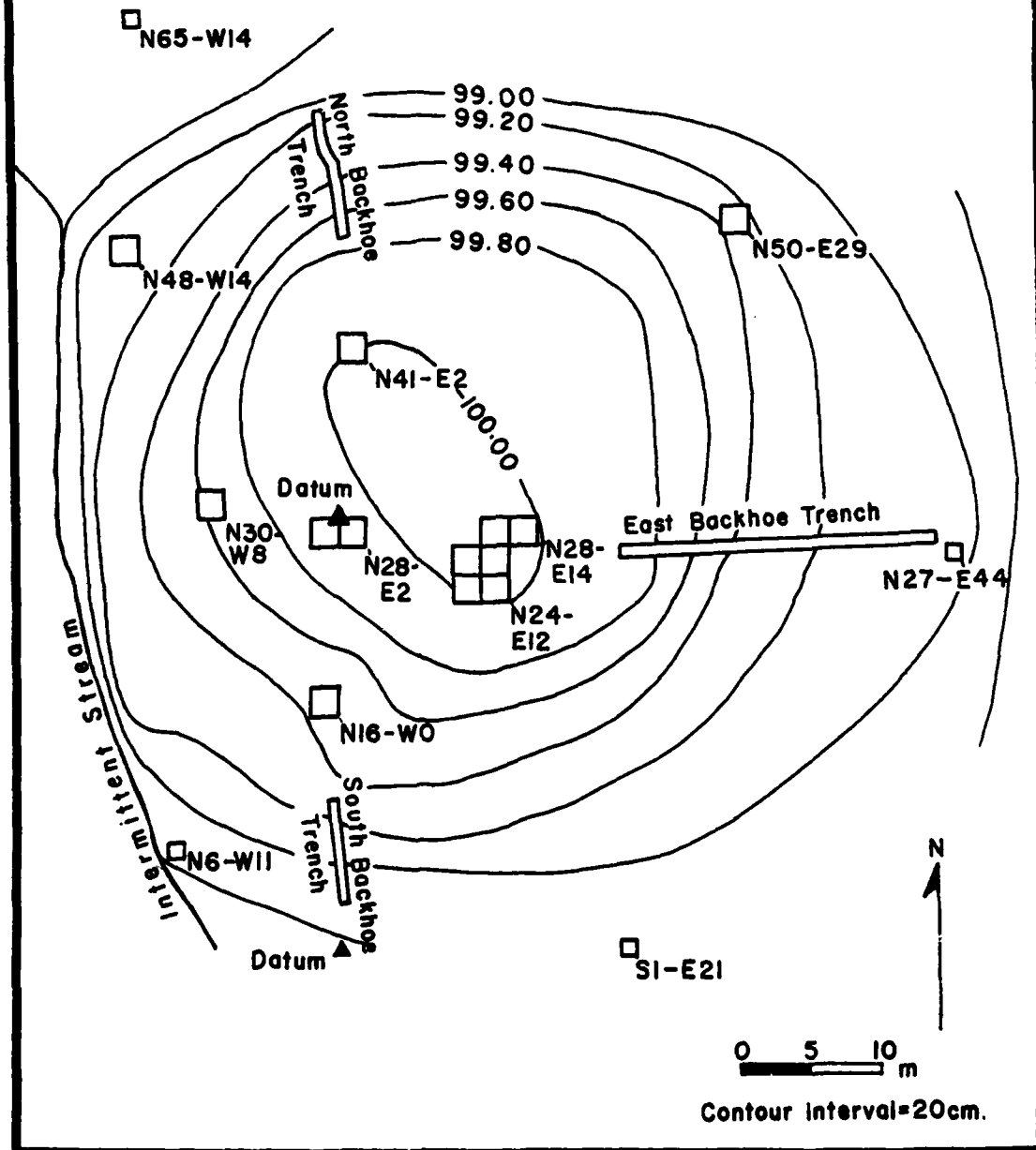


Figure 3. Bug Hill site excavation plan and contour map.

## LABORATORY METHODS

A field laboratory was responsible for receiving, washing, sorting, cataloging, and preparing material to be sent to the Archaeological Research and Management Center's laboratory in Norman. The Norman laboratory was essentially responsible for refining the classification and for basic analysis of each artifact category. They were additionally charged with performing flotation analyses, residue sorts of these materials as well as those recovered during waterscreen operations, and preparing select classes of materials for more detailed analysis. Lithic type identifications and faunal analysis were also conducted in the Norman laboratory.

The catalog system and lithic type designations are the same as those used previously during the Clayton Lake Project, and the interested reader is referred to Vehik (1979b: 74-81) and Lintz (1979a: 28-37) for a detailed discussion of these. The only classes of material not assigned individual specimen numbers were debitage, burials, unmodified fauna, and baked clay/ash concentrations. These materials were separated and identifying tags with site number and lot number (designating horizontal and vertical provenience) were placed in each individual bag of material.

A summary of measurements is provided for most artifact categories. Linear measurements were taken in millimeters with a sliding caliper and weights in grams were determined with a Dialogram beam balance. All interval measurements reflect maximum dimensions. Colors were determined by using Munsell Soil Color Charts (1975).

Lithic type identifications were determined for each chipped stone category, but due to the large amount of debitage this category was sampled. Unmodified faunal remains were also sampled for the same reason. A random sampling technique was employed. Essentially, a percentage of levels in each square was drawn. An attempt was made to correlate arbitrary levels with natural strata, but uneven stratigraphic boundaries prohibited following this procedure completely. Ten percent of the levels were sampled for lithic debitage and 25% for unmodified faunal remains. Lithic types of all the debitage (23,884 flakes) from N28-E2 were determined to obtain vertical information about lithic use. This included larger than  $\frac{1}{4}$ -inch debitage recovered during waterscreening and flotation. These data and unprovenienced flakes are not included in the 10% random sample. The random sample constitutes approximately 8% of the remaining debitage, and should illustrate the horizontal distribution of lithic types across the site.

Unmodified faunal remains were treated in a similar manner. All faunal remains from the control square as well as the rest of N28-E2 and N28-E12 (the deepest square at the site) were identified. The 5 cm arbitrary levels in the 1 m x 1 m control square in the southeast

corner of N28-E2 were combined into 10 cm levels for comparability. The remaining faunal materials were sampled through a 25% random sample drawn in a similar manner to that described above.

### III

## STRATIGRAPHY AND CHRONOLOGY

### STRATIGRAPHY

Even though the midden deposits at the site are distinguishable from the surrounding natural solum by a higher organic matter content as indicated by the dark color of the soils, the definition of stratigraphic variation is hampered by the relative homogeneity of the deposits and dark soils. Rodent burrowing, other forms of bioturbation, and human activities also influence stratigraphic mixing. This is best illustrated in N16-W0 and N28-W0 where burial bits have mixed various stratigraphic levels. In other parts of the site, occupational surfaces may have been modified and improved which could also disturb stratigraphic units.

Stratigraphic zones are deeper at the center of the site, become thinner toward the edges of the site, and in the case of the first two strata lens out. Stratum I covers a greater surficial area than Stratum II, but this reflects sheet erosion and disturbance through plowing. Figures 4 and 5 illustrate this from the backhoe trenches.

Four stratigraphic zones consisting of variations of silt loam are noted. An unevenly distributed plowzone (Stratum Ip) is present in several squares and in the eastern and northern backhoe trenches. Stratum II is divided into Strata IIa and IIb in many squares toward the center of the site. This differentiation is made on the basis of fewer cultural remains and more baked clay and ash in Stratum IIb. Color descriptions are taken from moist samples and Munsell Soil Color Charts (1975) were used. Figures 6-8 illustrate the stratigraphic variation from various squares.

#### Stratum Ip

This stratum does not occur in each excavated area, and represents the plowzone. It is present in N30-W8, N50-E29, the squares forming the contiguous block (N24-E10) excavated in the east-central part of the site, the north backhoe trench, and in part of the east backhoe trench. It is likely that the plowzone occurred in other squares, but was indistinguishable because of the dark, homogeneous soils. A good example is in the east backhoe trench where the plowzone was defined at the west end but could not be discerned in most of the north wall profile (Figure 4). A soil disconformity beginning 11.2 m from the east end of the trench is believed to represent Stratum Ip.

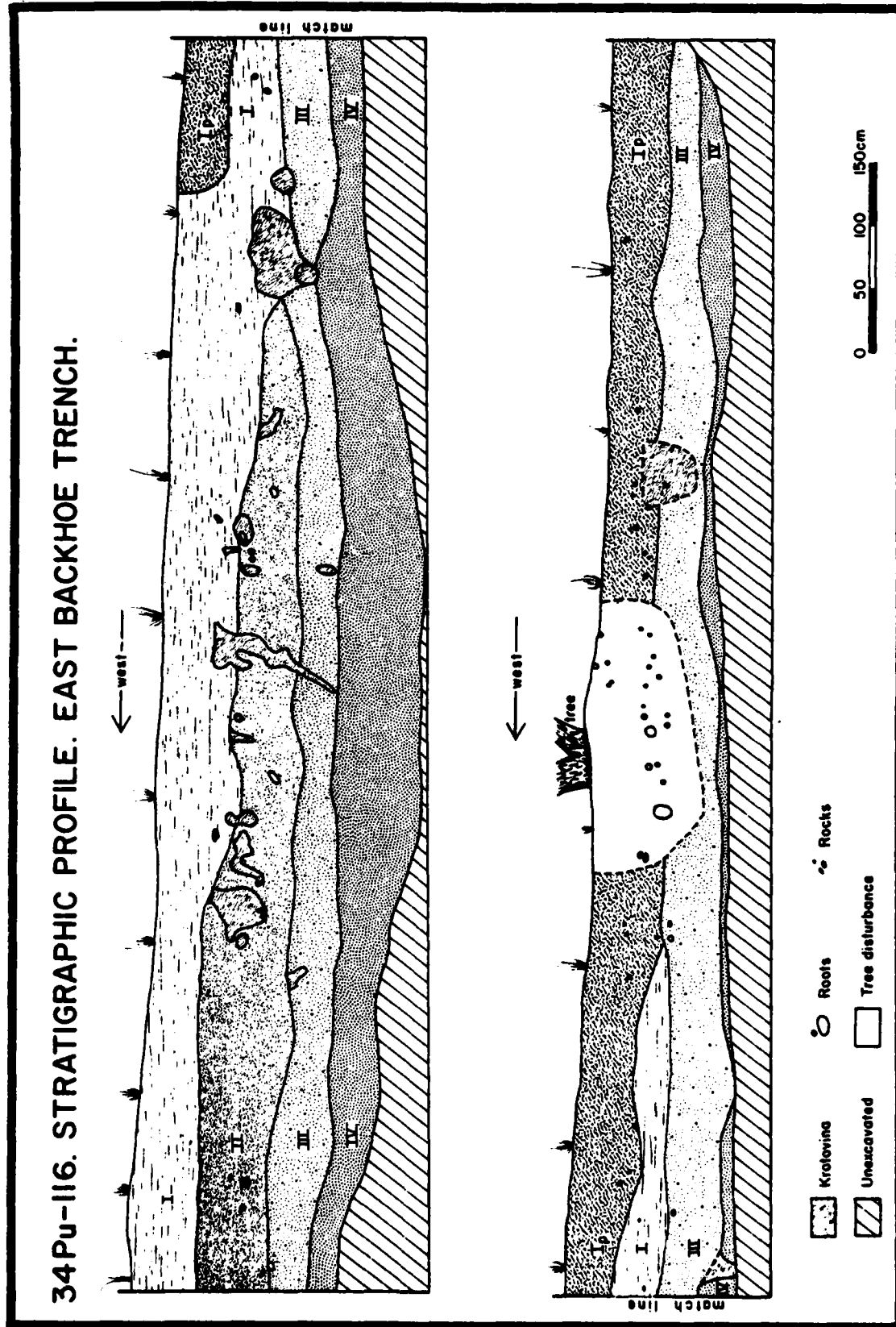


Figure 4. Stratigraphic profile of east backhoe trench.

# 34 Pu-116. STRATIGRAPHIC PROFILES.

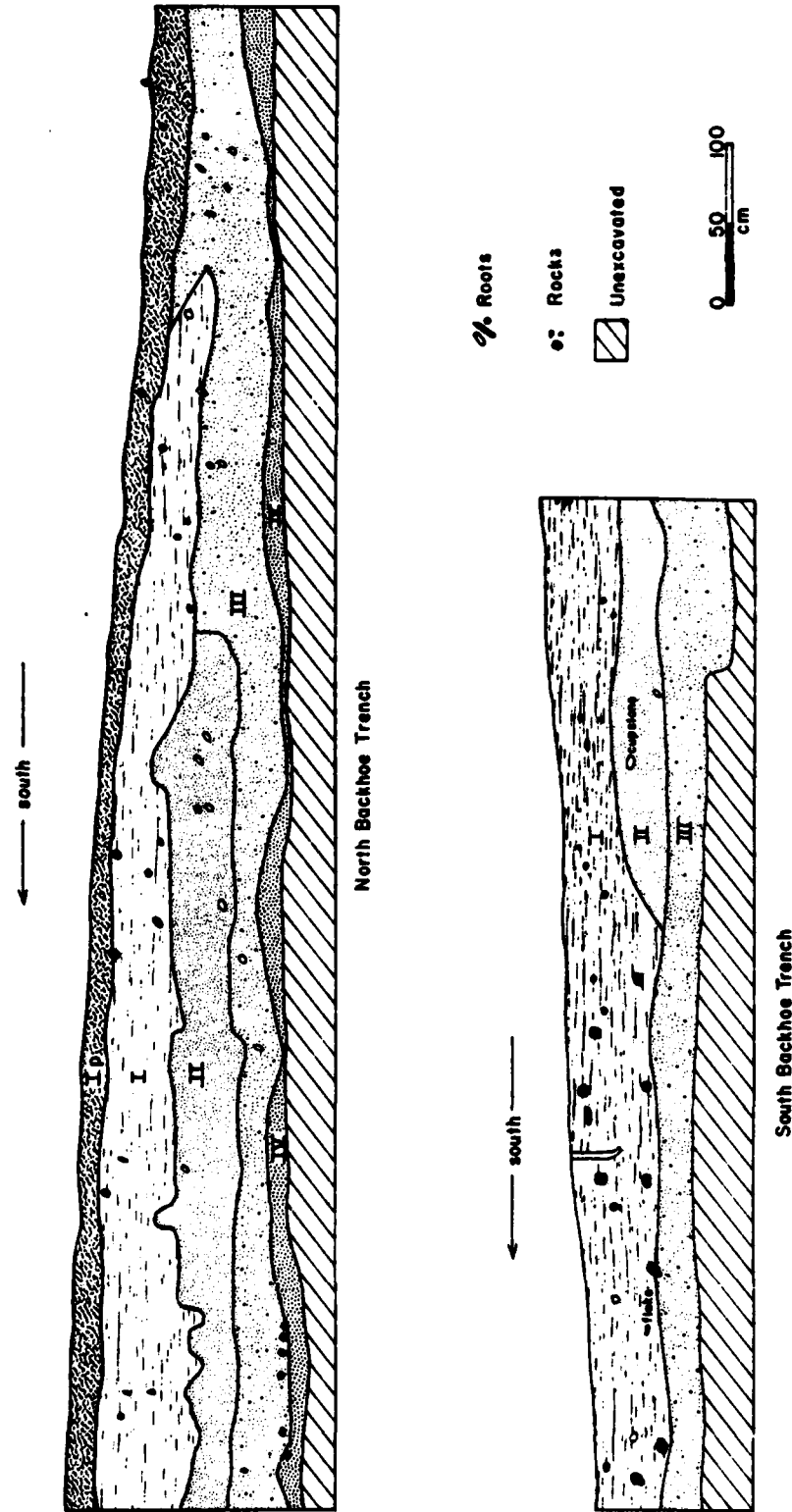


Figure 5. Stratigraphic profiles of north and south backhoe trenches.

**Figure 6. a: Stratigraphic profile along east wall of  
N24-E12.**

**b: Stratigraphic profile along east wall of  
N26-E12.**



A



B

# 34Pu-116. STRATIGRAPHIC PROFILES.

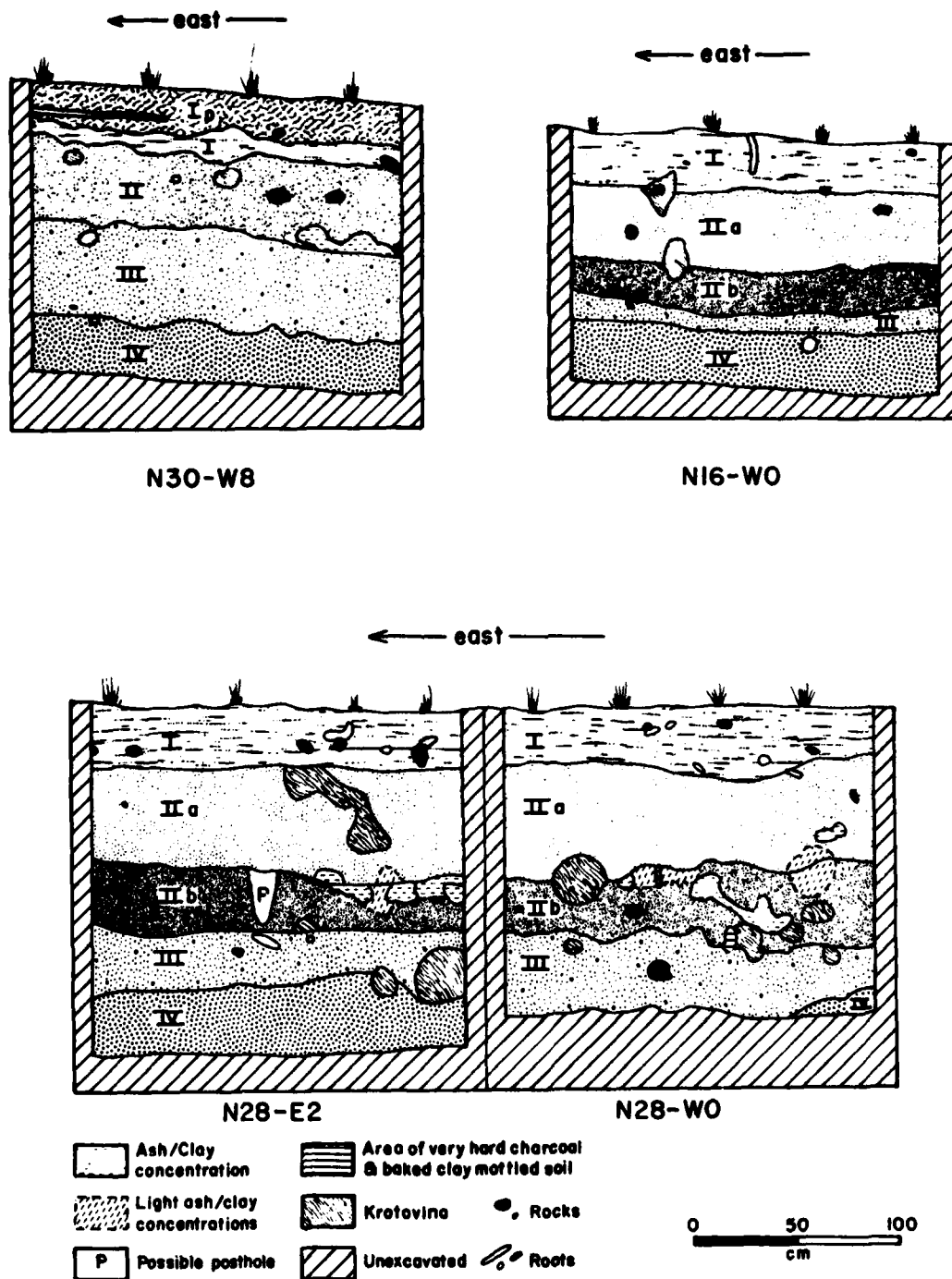


Figure 7. Stratigraphic profiles in N30-W8, N16-W0, N28-E2, and N28-W0.

# 34Pu-II6. STRATIGRAPHIC PROFILES.

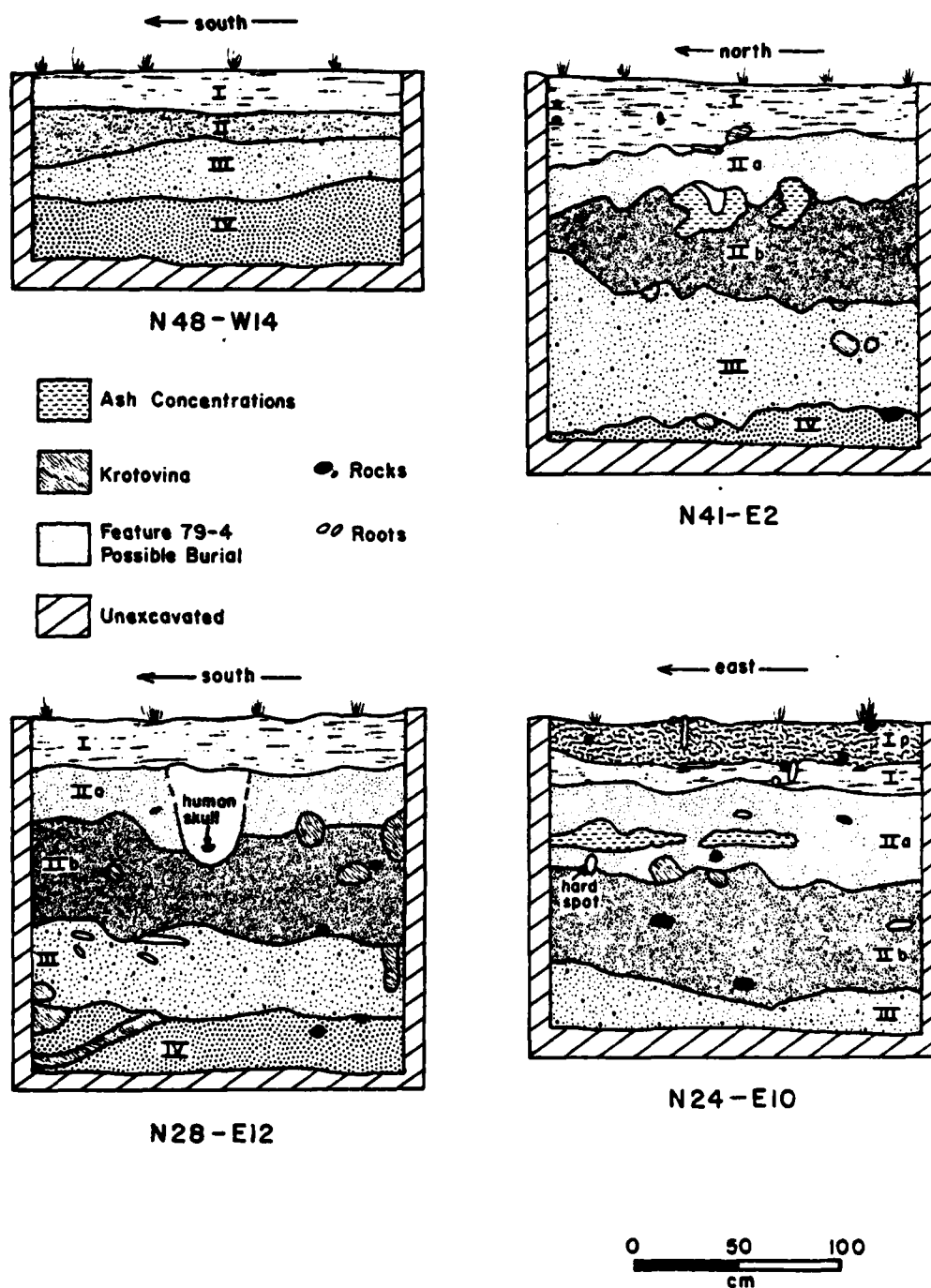


Figure 8. Stratigraphic profiles in N48-W14, N41-E2, N28-E12, and N24-E10.

Stratum Ip ranges from 13-27 cm in thickness with an average of 22 cm. Toward the mound edge, in the east backhoe trench, it is 30-60 cm thick. It is characterized by a very dark brown (10YR 3/3) loam to sandy loam which is structureless, soft, very friable, slightly sticky, and plastic. Small to large vertical and horizontal roots and small to medium rocks are interspersed throughout. Krotovina (irregular tubular streaks resulting from the filling of tunnels made by burrowing animals) are also common. Cultural remains including baked clay, charcoal, chipped stone artifacts, pottery, bone, and shell are abundant. These tend to diminish in quantity toward the edges of the site. Most of the bone consists of small, fragmentary pieces of which many are burned. This reflects plowing and may be associated with land clearing through burning. This stratum has a clear or abrupt, smooth-wavy boundary to:

#### Stratum I

This stratum lenses out at the eastern and northern edges of the site (Figures 4 and 5). It has a depth of 18-33 cm, and varies in thickness from 5-45 cm with an average of 17-23 cm. It is composed of dark grayish brown (10YR 3/2) loam or fine silt loam which is slightly hard, friable, slightly sticky, plastic, and structureless. Many small to large vertical and horizontal roots, angular sandstone cobbles, charcoal, and baked clay are common. Cultural materials are abundant throughout the stratum. It has a clear, smooth to abrupt, wavy boundary to:

#### Stratum II

This stratum is more evident toward the edges of the site but also lenses out. At the center of the site it is subdivided. These variations are described below.

Overall, Stratum II has a depth of 33-42 cm and ranges in thickness from 7-41 cm with an average of 16-23 cm. It is made up of very dark grayish brown (10YR 3/2) loam or fine silt loam. It is friable, slightly sticky, plastic, and structureless. There are a few large roots, but many small vertical and horizontal roots. Small rocks are interspersed throughout, but more cultural remains occur than in Stratum I. Baked clay, charcoal flecks, bone, and shell (mussels and gastropods) are abundant. Most of the bone are large and unburned. It has a clear, wavy boundary.

#### Stratum IIa

This is a division of Stratum II at the center of the site. In N28-E2, it has a depth of 33-79 cm. Its thickness ranges between

15-70 cm with an average of 33-47 cm. The soils are a dark brown (10YR 3/3) sandy loam to loam. They are structureless, soft, very friable, slightly sticky, and plastic. Small and large krotovina and many fine to large roots are common. The stratum tends to be ashy and occasional clumps of ash, charcoal, and baked clay are present. Cultural materials are very abundant, especially bone and shell. It has a clear, wavy boundary to:

#### Stratum IIb

This is another division of Stratum II at the center of the site. It is 79-115 cm deep in N28-E12, and varies in thickness between 9-70 cm with an average of 27-59 cm. It is composed of grayish brown (10YR 5/2) loam. The soils are structureless, slightly hard, friable, slightly sticky, and plastic. Medium to large roots, a few interspersed rocks, and rodent disturbances are common. The amount of cultural material is diminished, but bone and shell are plentiful. Overall, this division has more clumps of baked clay and ash than Stratum IIA. It has an abrupt, wavy boundary to:

#### Stratum III

This stratum is present across the entire site and in N28-E12 it has a depth of 115-152 cm. It is between 6-95 cm thick with an average of 24-36 cm. It is made up of a dark brown (10YR 4/3) silt loam which is slightly hard, friable, slightly sticky, and plastic. Krotovina, roots, and small rocks are common. The amount of cultural material declines when compared to the upper strata. It has a gradual, wavy boundary to:

#### Stratum IV

This is the basal stratum at the site and occurs below 152 cm in N28-E12. It is present in 10 excavation units as well as the backhoe trenches, and ranges in thickness from 3-42 cm. It is characterized by being a dark yellowish brown (10YR 4/4) silt loam with moderate to strong structure and small angular blocky peds which have a few fine to medium roots attached to the sides and occasional silt or silt flour accumulation between peds. Its consistency is slightly hard to hard, friable, and sticky. Rodent disturbance in the form of krotovina, roots, and small rocks are common. Cultural material (only flakes) are very much decreased from the upper strata.

## Discussion

Chemical and mechanical analyses of soils from five strata in N28-E12 and four in N50-E29 were conducted by the Soil and Water Service Laboratory at Oklahoma State University. A summary of these tests are presented in Table 2.

Table 2. Physical and chemical properties of soils in N28-E12 and N50-E29.

Sample Number	Stratigraphic Unit	Textural Unit	Grain Size			Organic Content			
			% Sand	% Silt	% Clay	pH	%	P	
N28-E12									
105	I	Sandy Loam	63.25	20.75	16.0	7.4	2.9	445	
106	IIa	Sandy Loam	59.50	24.50	16.0	8.1	2.2	350	
107	IIb	Sandy Loam	53.50	32.50	14.0	8.1	1.8	163	
108	III	Loam	35.0	41.0	24.0	8.2	0.1	163	
109	IV	Clay Loam	36.50	36.50	27.0	8.3	0.3	158	
N50-E29									
110	Ip	Loam	42.25	36.75	18.0	6.3	1.9	357	
111	I	Loam	45.25	34.75	18.0	6.3	1.6	290	
112	II	Clay Loam	27.0	44.75	28.25	6.4	1.0	264	
113	III	Silt-Clay Loam	18.10	50.60	31.30	6.2	1.0	217	

P = Phosphate Lbs/A.

These results conform to the stratigraphic descriptions provided above. Organic matter content is relatively high in Strata Ip, I, IIa, and IIb. However, it is lower toward the edge of the site (N50-E29). These results are not unexpected since the central part of the site was more intensively utilized and contains more organic remains. The same is true for the vertical differences in the sense that Strata III and IV reflect basal strat and do not contain as many organic remains. The high levels of phosphate in Strata I and IIa may also reflect a greater intensity of organic remains. On the other hand, phosphate is retained more readily in soils with a higher clay content such as Strata III and IV in N28-E12 and Strata II and III in N50-E29 (Mallouf 1976: 485). Soils at the edges of the site are slightly acid and those in the center are alkaline to strongly alkaline.

In summary, these stratigraphic data suggest that Strata IIa, IIb, and possibly I reflect the most intensive use of the site. Strata III and IV appear to be basal deposits, and Stratum IV may represent the original ground surface. The fact that Strata I and II lens out toward the north and east edges suggest an accretional accumulation of organic residue toward the central part of the site. Galm (1978b: 21) has suggested a similar formation at the Curtis Lake site, but he also argues that cultural loading in the form of adding alluvial silt, perhaps to maintain and improve living surfaces, may have occurred. There is little evidence of cultural loading of alluvial silts at 34Pu-116. The primary constituent of the soils in Strata I, IIa, and IIb is sand with silt being more common in Strata III and IV.

#### CULTURAL CHRONOLOGY

Eighteen radiocarbon samples were submitted for dating to Beta Analytic, Inc., Coral Gables, Florida. The samples consisted of wood charcoal. Four samples were submitted from features (burials) and will be discussed later. The rest of the samples are from 10 cm arbitrary levels with the lowest being from Level 13 (120-130 cm). Throughout the report, calendrical dates calculated to 5730 years will be used. This will keep the dates consistent with those from other sites in the Clayton Lake area.

The sequence of radiocarbon dates from the Bug Hill site are listed in Table 3, and graphically displayed in Figure 9. It is apparent that there are several inverse dates, but the overall sequence is comparable to radiocarbon dates obtained from the Scott and Wann sites (Galm and Flynn 1878: 77-82, Tables 9-10).

The dates at the Bug Hill site are stratigraphically consistent. Dates of A.D. 859  $\pm$ 60 associated with Strata I (N24-E10) and A.D. 617  $\pm$ 80 with Ip (N50-E29) are inverse. This may be the result of cultivation and bioturbation since the upper 20 cm of the site are disturbed. Another reason for this reversal may be due to the placement of N50-E29. This square is at the edge of the site, and there is a 40 cm difference between it and N24-E10 which is in the center of the site. However, cultural material recovered from these strata (small corner-notched points and decorated ceramics) are consistent with the A.D. 859  $\pm$ 60 date and possibly the earlier date.

Four dates were obtained from levels associated with Stratum IIa. One sample (A.D. 278  $\pm$ 70) is from the boundary between Strata I-IIa. Based on the ceramics and other recovered material, it is within the acceptable range. Another sample from the top of Stratum II in N30-W8 provides a date of 457  $\pm$ 95 B.C. This date is too early for its placement, even if we consider that this square is at least 30 cm lower than the top of the site. A small ash/clay concentration and

Table 3. Summary of radiocarbon dates from the Bug Hill site (34Pu-116).

Sample Number	Laboratory Number	B.P. Date (5568)	B.P. Date (5730)	Uncorrected Date	TRC B.P. Date	Corrected Date	Charcoal (in grams)	Excavation Unit	Depth	Strata/Feature
34Pu-116-2	Beta-1409	1295 ±80	1333 ±80	A.D. 617 ±80	1272 ±95	A.D. 678 ±95	7.3	N50-E29	10-20 cm	I p
34Pu-116-3	Beta-1410	1060 ±60	1091 ±60	A.D. 859 ±60	1045 ±73	A.D. 905 ±73	13.4	N26-E10	20-30 cm	I
34Pu-116-4	Beta-1411	1625 ±70	1672 ±70	A.D. 278 ±70	1609 ±75	A.D. 341 ±75	11.4	N24-E10	30-40 cm	I-IIa
34Pu-116-5	Beta-1412	2185 ±60	2248 ±60	298 ±60 B.C.	2233 ±113	283 ±113 B.C.	12.6	N28-E2	40-50 cm	IIa
34Pu-116-18	Beta-1425	2340 ±95	2407 ±95	457 ±95 B.C.	2416 ±142	466 ±142 B.C.	11.4	N30-W8	40-50 cm	II
34Pu-116-6	Beta-1413	1930 ±80	1986 ±80	36 ±80 B.C.	1941 ±88	A.D. 9 ±88	17.2	N24-E10	50-60 cm	IIa
34Pu-116-7	Beta-1414	2235 ±55	2300 ±55	350 ±55 B.C.	2292 ±111	342 ±111 B.C.	15.1	N24-E10	60-70 cm	IIa
34Pu-116-8	Beta-1415	2490 ±70	2562 ±70	612 ±70 B.C.	2598 ±126	648 ±126 B.C.	10.0	N28-E2	70-80 cm	IIa-IIb
34Pu-116-9	Beta-1416	2860 ±75	2943 ±75	993 ±75 B.C.	3082 ±81	1112 ±81 B.C.	29.1	N24-E10	80-90 cm	IIb
34Pu-116-10	Beta-1417	3265 ±70	3360 ±70	1410 ±70 B.C.	3586 ±85	1636 ±85 B.C.	12.8	N24-E10	90-100 cm	IIb
34Pu-116-11	Beta-1418	3350 ±70	3447 ±70	1497 ±70 B.C.	3697 ±82	1747 ±82 B.C.	18.7	N24-E10	100-110 cm	IIb-III
34Pu-116-12	Beta-1419	3300 ±90	3396 ±90	1446 ±90 B.C.	3632 ±100	1682 ±100 B.C.	14.9	N28-E2	110-120 cm	III
34Pu-116-14	Beta-1421	2920 ±75	3005 ±75	1055 ±75 B.C.	3139 ±81	1189 ±81 B.C.	16.9	N41-E2	110-120 cm	IIb-III
34Pu-116-13	Beta-1420	3455 ±125	3555 ±125	1605 ±125 B.C.	3835 ±132	1885 ±132 B.C.	11.5	N24-E10	120-130 cm	III
34Pu-116-15	Beta-1422	2750 ±70	2830 ±70	880 ±70 B.C.	2922 ±86	972 ±86 B.C.	10.4	N16-W0	90-100 cm	IV
34Pu-116-16	Beta-1423	3240 ±105	3334 ±105	1384 ±105 B.C.	3553 ±119	1603 ±119 B.C.	5.3	N28-E14	70-80 cm	F79-16 Burial 4
34Pu-116-17	Beta-1424	2175 ±70	2238 ±70	288 ±70 B.C.	2221 ±119	271 ±119 B.C.	14.7	N28-W0	90-110 cm	F79-19 Burial 3
34Pu-116-1	Beta-1166	2725 ±85	2804 ±85	854 ±85 B.C.	2890 ±99	941 ±99 B.C.	46.8	N24-E12	65 cm	F79-31 Burial 7
										F79-36 Burial 9

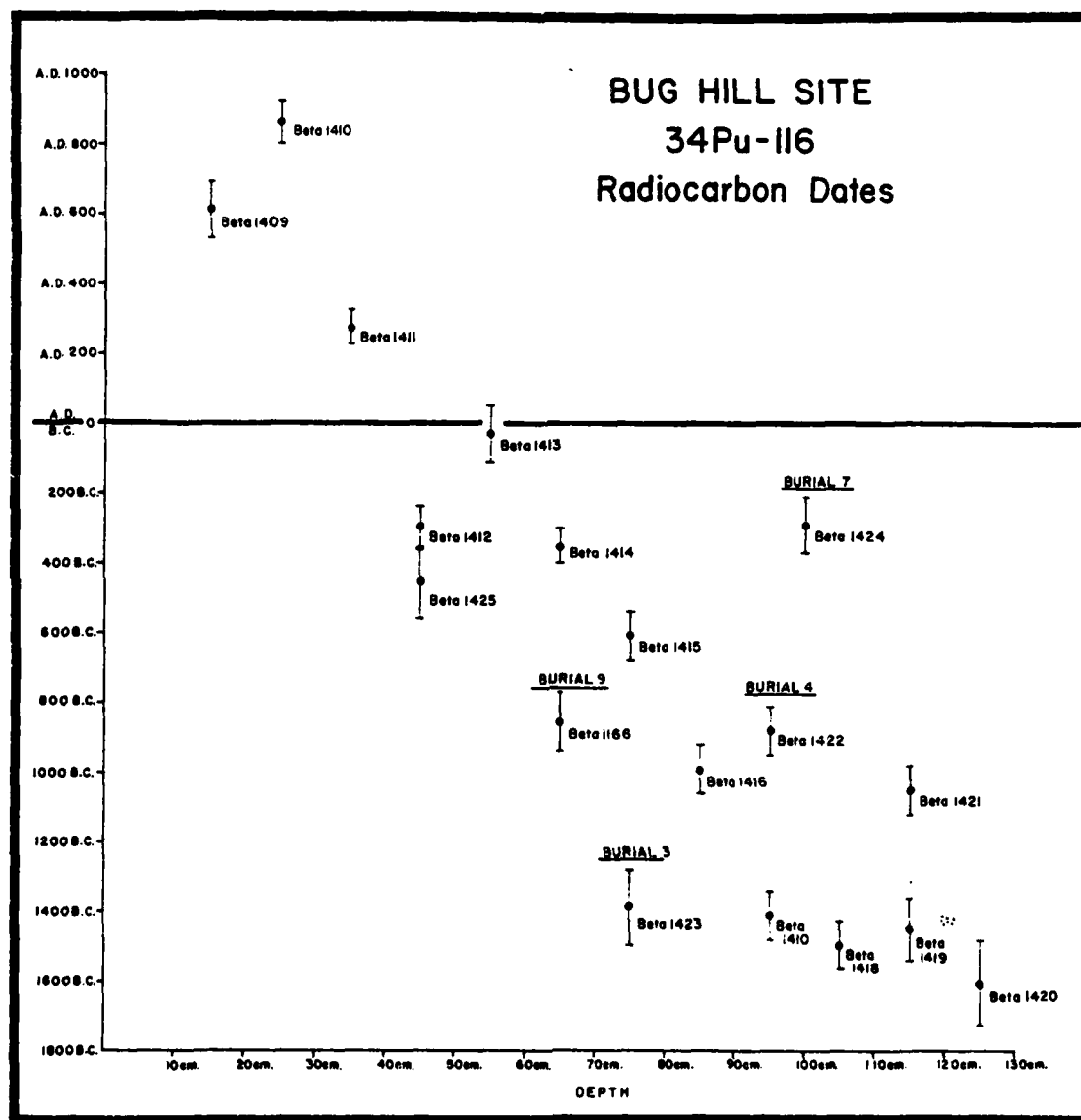


Figure 9. Radiocarbon dates from the Bug Hill site in stratigraphic sequence. Vertical bars indicate standard deviations.

rodent disturbance at the bottom of Level 5 (40-50 cm) may have contaminated this sample. The middle of Stratum IIa is represented by two samples. One from N28-E2 is dated at  $298 \pm 60$  B.C. and the other from N24-E10 is  $36 \pm 80$  B.C. The date from N28-E2 is within the acceptable range for its stratigraphic position and associated cultural material. The sample from which the  $36 \pm 80$  B.C. date was obtained is believed to be contaminated by later materials. This sample was collected in the vicinity of a large ash/clay concentration (Feature 79-34) in N24-E10, and there is evidence of extensive rodent disturbance. It is possible that the sample provides a date for Feature 79-34. The bottom of Stratum IIa in N24-E10 is dated at  $350 \pm 55$  B.C. If this date is accepted, it falls nicely within the range of dates in Stratum IIa ( $350 \pm 55$  B.C. to A.D.  $278 \pm 70$ ).

Four samples submitted from Stratum IIb range between  $612 \pm 70$  B.C. and  $1497 \pm 70$  B.C. These dates are acceptable in regard to their stratigraphic placement and associated cultural material. One sample from 70-80 cm in N28-E2 dates the boundary of Strata IIa-IIb at  $612 \pm 70$  B.C. Another sample from 80-90 cm in N24-E10 is dated at  $993 \pm 75$  B.C. These dates do not overlap, but they are consistent with their position in the upper part of Stratum IIb. Acceptable dates of  $1410 \pm 70$  B.C. (90-100 cm) and  $1497 \pm 70$  B.C. (100-110 cm) are associated with the lower portions of Stratum IIb, and the latter determination is from the boundary of Strata IIb-III. One other sample (Beta-1421) associated with the boundary of Strata IIb-III is from Level 12 (110-120 cm) in N41-E2. A date of  $1055 \pm 75$  B.C. was obtained. This date is too recent for its stratigraphic position and is not comparable to other dates associated with the lower part of Stratum IIb. The sample is believed to be contaminated by recent materials. It was obtained from a compact area of baked clay, charcoal flecks, and ash. Baked clay, ash, and charcoal begin to occur in the same portion of the square as high as Level 5 (40-50 cm). An ash/clay concentration and possible post-mold (Feature 79-15) also occur in the upper part of Level 9 (80-90 cm) in the same area of N41-E2. It is possible that this determination provides a date for Feature 79-15. Level 9 (80-90 cm) in N24-E10 is dated at  $993 \pm 75$  B.C.

Two samples were obtained from Stratum III. One from N28-E2 (110-120 cm) dates the upper part of Stratum III at  $1446 \pm 90$  B.C. This sample may be slightly disturbed since Levels 10-11 (90-110 cm) have several areas of baked clay, ash, and charcoal, and a large root extends across the square. As a result, the sample may actually date deposits associated with Stratum IIb. If this is the case, the date fits in and is consistent in its overlapping standard deviation with other dates from Stratum IIb. The final stratigraphic sample obtained from Level 13 (120-130 cm) in N24-E10 also corresponds to Stratum III. A date of  $1605 \pm 125$  B.C. was obtained, and there is no reason to doubt its stratigraphic placement.

Samples below 130 cm were not submitted because of the small amounts of charcoal, and cultural materials associated with these

levels are not sensitive enough to allow relative dating. This leaves 50 cm of the lower deposits and Stratum IV at the site undated. However, based on radiocarbon dates of  $1799 \pm 110$  B.C.,  $2098 \pm 90$  B.C., and  $2550 \pm 270$  B.C. at the Scott site (Galm and Flynn 1978: 79, Table 9) and a noncultural date ( $2242 \pm 90$  B.C.) of a possible post-flood episode at the nearby Wheeler Lee site, 34Pu-102 (Lintz 1982), it is not inconceivable that the earliest dates at the Bug Hill site would fall within this range.

Four dates were obtained from samples associated with burials, and are discussed fully with the description of these features. Basically, the dates associated with Burials 3 and 9 are considered to be too early for their stratigraphic placement while those associated with Burials 4 and 7 provide a reasonable estimate.

In summary, the majority of dates at the Bug Hill site are consistent with their stratigraphic placement and associated cultural remains. Several of the problematical determinations are due to bioturbation and mixing of depositional units and cultural material as a result of human occupation. Overall, the dates provide a localized chronological sequence beginning as early as the Late Archaic period and extending to the early Caddoan period. They are also comparable to dated components at many of the other sites in the Jackfork Valley (Table 1) and to dated components at midden mound sites such as Scott, Wann, Curtis Lake, Williams, Troy Adams, and McCutchan-McLaughlin along Fourche Maline Creek in the Wister Valley.

## IV

### CULTURAL FEATURES

Forty-one feature numbers were assigned during the 1979 season. Several classes of features are noted: rock concentrations, ash/clay concentrations, postmolds, pits, and burials. Table 4 presents material recovered from waterscreen residue sorts from the features.

#### ROCK CONCENTRATIONS

Seven rock concentrations are identified between 21-146 cm across the site. The majority (4) were less than 30 cm deep.

##### *FEATURE 79-1 (Figure 30)*

This feature, in the southeast quarter of N30-W8, was at a depth of 25 cm (Stratum I). It consists of six tightly clustered cracked and waterworn angular sandstone rocks. It has a diameter of 24 cm. One modified flake was associated, and other nearby materials include a broken contracting stemmed point, one tested cobble, and two cup-stone fragments.

##### *FEATURE 79-3 (Figures 10 a, 30)*

This feature, in Stratum I, consists of at least 73 loosely scattered angular sandstone rocks at a depth of 21 cm in N16-W0. Most of the rocks are cracked and appear to be thermally altered. In the south half of the square the rocks are more dispersed, but in the north-central part there is a tighter concentration of about 16 rocks. Associated artifacts include a mano fragment, a grinding slab fragment, and a bifacially pitted stone. In addition, a small amount of bone, charcoal, and a small ash concentration were present in the same level.

##### *FEATURE 79-13 (Figure 31)*

This feature occurs at a depth of 70 cm (Stratum IIb) in the south half of N16-W0. It consists of clusters of cracked sandstone which appear burned. It is distributed over a 78 cm x 150 cm area. The soil matrix in the feature is a dark brown silt loam containing numerous mussel shells, gastropods, a few bones, and charcoal. The remaining soil in the square, north of the feature, is yellowish brown silt loam. The loose, scattered nature of the sandstone clusters suggest they may be a secondary deposit. A biface fragment, modified flakes, a cut turtle bone, and mussel shells are associated.

Table 4. Cultural remains (in grams) from residue sorts of feature matrices.

Type of Feature	Excavation Unit	Arbitrary Level (10 cm)	Charcoal	Nutshell	Bone	Gastropods	Other
<b>Rock Concentration</b>							
Feature 79-1	N30-W9	3	0.2	0.2	3.1	-	-
<b>Ash/Clay Concentrations</b>							
Feature 79-2	N28-E12/						
Feature 79-6	N28-E14	7	1.5	1.5	17.9	0.6	1.1 g Mussel shell; 2.9 g baked clay
Feature 79-7	N30-W8	7	2.1	3.4	11.3	1.3	-
Feature 79-11	N28-E2	5	2.2	0.2	3.4	0.8	-
Feature 79-15	N28-E2	9	0.7	0.4	3.0	0.1	-
Feature 79-17	N41-E2	9	2.3	1.9	13.9	1.2	-
Feature 79-26	N28-E14	9	0.1	-	0.1	<0.5	-
Feature 79-27	N28-E14	13	<0.1	<0.1	<0.1	<0.1	-
Feature 79-34	N28-W0	11	2.2	7.8	16.8	1.9	-
	N24-E10/						
Feature 79-40	N24-E12	7	4.5	0.8	58.4	2.0	-
Feature 79-41	N26-E12	10	3.3	3.0	51.4	2.7	-
	N24-E12	10	1.3	0.2	7.1	0.5	-
<b>Postmolds</b>							
Feature 79-5	N28-E12	10					
Postmold #1			0.1	<0.1	0.3	<0.1	-
Postmold #2			0.2	0.1	1.2	0.1	-
Feature 79-10	N28-E12	12					
Postmold #2			0.2	0.2	1.0	0.1	-
Postmold #3			0.8	<0.1	1.3	0.5	-
Postmold #4			0.5	0.6	<0.5	0.2	-
Postmold #5			0.6	0.5	4.9	0.3	-
Postmold #6			0.6	0.6	3.4	<0.1	-
Postmold #7			0.1	<0.1	1.6	0.2	-
Postmold #8			1.0	0.1	1.3	0.1	-
Postmold #9			0.8	0.3	4.8	0.3	-
Postmold #10			0.4	<0.1	2.2	0.2	-
Postmold #11			0.6	<0.1	5.0	0.1	-
Postmold #12			0.1	<0.1	<0.6	<0.1	-
Feature 79-14	N28-E2	12	0.7	<0.1	9.2	<0.1	-
Feature 79-23	N28-E14	11					
Postmold #1			0.4	0.7	8.8	0.6	-
Postmold #2			0.2	0.3	0.3	0.4	-
Postmold #3			0.1	0.2	1.5	0.2	-
Postmold #4			0.1	0.2	0.7	0.2	<0.1 g Seeds
Feature 79-25	N28-E14	13	0.1	0.4	1.4	0.1	-
Feature 79-28	N28-E14	14	0.2	-	<0.1	<0.1	-
Feature 79-29	N28-E14	15	<0.1	-	<0.1	<0.1	-
Feature 79-37	N26-E10	9	2.1	0.2	1.6	0.1	-
Feature 79-42	N26-E12	11					
Postmold #1			0.2	0.2	2.1	0.1	-
Postmold #2			<0.1	<0.1	0.6	0.3	-
<b>Pit-Like Features</b>							
Feature 79-12	N28-E2	9	2.3	1.4	6.6	0.3	-
<b>Burials</b>							
Feature 79-19 (Burial 3)	N28-E19	8	5.3	2.8	39.7	2.5	2 Flakes
Feature 79-16 (Burial 4)	N16-W0	10	10.4	5.8	80.3	<0.1	1.3 g Teeth; 4 Flakes
Feature 79-32 (Burial 7)	N28-W3	11	21.8	22.4	302.1	26.7	0.3 g Seeds; 3.0 g Mussel shell; 102 Flakes
Feature 79-33 (Burial 8)	N24-E12	5	0.3	0.5	19.9	0.9	7.8 g Mussel shell; 70 Flakes
Feature 79-36 (Burial 9)	N24-E12	7	46.8	16.0	266.9	13.4	<0.1 g Seeds; 58.2 g Mussel shell; 777 Flakes
Feature 79-38 (Burial 10)	N26-E12	9 11	8.2	-	24.6	3.7	<0.1 g Seeds; 11.7 g Mussel shell; 175 Flakes
Feature 79-39	N26-E10	10	6.1	-	34.5	0.8	<0.1 g Seeds; 4.8 g Mussel shell; 135 Flakes

- Figure 10. a: Feature 79-3, rock concentration, at a depth of 21 cm in N16-W0.
- b: Feature 79-40, ash/clay concentration, in N26-E12. Feature 79-39, Burial 11, is along the right side of the photograph.



*FEATURE 79-20*

Nine angular sandstone rocks form a small cluster at a depth of 146 cm (Stratum IV) in the southwest quarter of N41-E2. The matrix around the feature is brown to light brown silt loam containing small flecks of burned nutshell and orange baked clay. Other associated materials are a biface fragment and 21 unmodified flakes. The feature is believed to extend into the south wall of the square. The observed portion measures 27 cm x 38 cm.

*FEATURE 79-30 (Figure 30)*

This is a loose concentration of rounded sandstone oriented diagonally across the center of N50-E29. It was noted at a depth of 30 cm (Stratum I), and the excavation floor at this level contained baked clay, charcoal, and shell fragments. Baked clay is concentrated more toward the northwest corner of the square. Cultural material associated with the feature are two thin biface I's, two split cobbles, biface fragments, debitage, a mano fragment, and two pitted stones (one bifacial and one unifacial).

*FEATURE 79-32 (Figure 30)*

This feature, consisting of tightly clustered sandstone, occurs at 25 cm (Stratum I) in N26-E12. It measures 31 cm x 39 cm. Small amounts of charcoal occur in sediments around the feature, but no cultural material is associated.

*FEATURE 79-35 (Figure 32)*

This is a concentration of angular and rounded sandstone and quartzite cobbles in the northwest quarter of N24-E10 at a depth of 57-60 cm (Stratum IIa). It is composed of several small groups of three to five rocks. In the northeast corner of the square an ash/clay concentration (Feature 79-34) was encountered, but is not associated with the rocks. Cultural material found within or near Feature 79-35 include an expanding stemmed point fragment, a mano fragment, mussel shell, and a potsherd.

*ASH/CLAY CONCENTRATIONS*

Eight ash/clay concentrations were located. An additional four ash/clay concentrations are associated with postmolds. They ranged from 40-107 cm below surface with an average depth of 79 cm. In addition to the features described below, ash, clinkers, and baked clay were present in almost every excavation unit in the central part of the site.

*FEATURE 79-2 (Figure 32)*

This consists of three small concentrations of tan ashy material combined with shell, charcoal, and orange baked clay flecks in the northwest part of N28-E12. It occurs at a depth of 61 cm (Stratum IIb) and measures 72 cm x 16 cm. It possibly extends into the west wall of the square. A tree root, terminating in the northwest baulk of the square, has disturbed the feature.

*FEATURE 79-6 (Figure 31)*

This combination ash/clay concentration and possible postmold was encountered at a depth of 60 cm (Stratum III) in the northeast quarter of N30-W8. The ash/clay concentration is approximately 85 cm long and 35 cm wide and may extend into the north wall. It differs from other concentrations by having a stacked appearance with a light gray top and yellowish-red bottom. Additional concentrations of ash and clay were noted in the northwest corner of the square. The postmold is approximately 20 cm south of the west end of the ash/clay lens. It is not very well defined due to the dark color of the sediments, but it appears to be lighter in color, has a looser fill, and a patch of powdery charcoal was in its center. It is approximately 10-20 cm in diameter with a depth of 5-15 cm. Associated cultural materials include 88 flakes, two biface fragments, two modified flakes, one polished bone, unmodified bone, mussel shell pieces, gastropods, baked clay, and small amounts of charcoal.

*FEATURE 79-7*

This ash/clay concentration and postmold occur in the southwest corner of N28-E2 at a depth of 40 cm (Stratum IIa). They are associated with compact, dark sediments with flecks of charcoal and baked clay distributed over the rest of this level. The ash/clay is concentrated in three discrete clusters measuring approximately 25 cm x 50 cm. The postmold is 25 cm south of the ash/clay lens and is 10 cm in diameter and 7 cm deep. The cross section indicates a rounded, convex base and regular sides. An additional dark stain (determined to be a krotovina) was in the southwest corner of the square.

*FEATURE 79-11 (Figure 31)*

This large ash/clay concentration, extending diagonally across the central portion of N28-E2 in a southwest-northeast direction, is approximately 110 cm wide. In the southwest corner of the square, four dark stains (possibly representing postmolds) were located. These features were at a depth of 80 cm (Stratum IIa-IIb). A possible pit (Feature 79-12), which will be described later, occurred at the northeast end of the ash/clay concentration. Two postmolds are in the ash concentration in the southwest corner of the square. They have diameters of 10-20 cm and are 4-7 cm deep. Both have straight sides

and convex bases. The other postmolds were in the cross section along the west and south walls of the 1 m<sup>2</sup> control square. One of these is 10 cm in diameter and 26 cm deep. The edges are regular and terminate in a pointed base. The other postmold has a diameter of 10 cm and is 27 cm deep, but the sides are curved toward the south and the bottom is rounded.

*FEATURE 79-15 (Figure 31)*

This feature consists of an ash/clay concentration and postmold at a depth of 80 cm (Stratum IIb) in N41-E2. Concentrations of ash/clay noted at a depth of 60 cm may relate to the feature which is oriented northwest-southeast and is 42 cm long and 30 cm wide. The matrix is a soft gray ashy lens containing baked clay and charcoal flecks. It is intensively disturbed by tree roots and rodent runs. The postmold is at the west end of the ash/clay lens and consists of a soft dark brown loam surrounded by a circle of compact loam containing charcoal and baked clay flecks. It has a diameter of 11 cm and is at least 6 cm deep. The sides are even and the base is pointed. Two biface fragments, a modified flake, and debitage in addition to the residue sorts are associated with the feature.

*FEATURE 79-17 (Figure 32)*

This ash/clay concentration is at a depth of 74-80 cm (Strata IIa-IIb) in the southwest quarter of N28-E14. It is 36 cm long and 44 cm wide and extends into the west wall of the square. The ash is concentrated in several discrete clusters which have been disturbed by roots and krotovina.

*FEATURE 79-21 (Figure 31)*

This feature is at a depth of 59 cm (Stratum IIa) in the southwest corner of N28-W0. It is 33 cm long and 26 cm wide and extends into the south wall of the square. The feature consists of a series of fairly well consolidated ash/clay clusters. Colors vary from very light gray or white to reddish-yellow to gray/dark gray in some areas. The ash seems to be more consolidated around the edges, while the center of the concentration has been disturbed by krotovina. No cultural materials were directly associated.

*FEATURE 79-26 (Figure 33)*

This may be a hearth at a depth of 120 cm (Stratum IIb) in the northwest quarter of N28-E14 and extending into the north wall. Its maximum dimensions are 22 cm x 43 cm. The feature is composed of a slightly basin-shaped concentration of baked clay overlain by a layer of light gray ashy soil. A biface fragment, 13 unmodified flakes, bone, mussel shell, baked clay, charcoal, and a clinker were in the surrounding matrix.

*FEATURE 79-27*

This is a concentration of ash/clay found at a depth of 100 cm (Stratum IIb) in the southwest corner of N28-W0. Immediately to the north is a large dark stain covering the central part of the square. The ashy area measures approximately 75 cm x 110 cm. An antler flaker is associated with it.

*FEATURE 79-34 (Figure 32)*

This is a large ash/clay layer (74 cm x 240 cm) in N24-E10 and N24-E12. It was first encountered at a depth of 54 cm (Stratum IIa). In N24-E12, it is more disturbed by krotovina. Its matrix is a compact pinkish gray sandy soil beneath a dark fine loam which contains baked clay and charcoal flecks. It is at the same level as a rock concentration (Feature 79-35). Associated materials are scarce and consist of only residue sorts (see Table 4).

*FEATURE 79-40 (Figures 10 b, 33)*

This feature has an abrupt, irregular boundary with the surrounding sediments. It is characterized by a baked clay layer beneath a lighter ash concentration. Small pieces of baked clay, bone, and charcoal are intermixed in the matrix and there is krotovina disturbance. The feature is in the center of N26-E12 at a depth of 93 cm (Stratum IIb). It is 174 cm long and 74 cm wide. A burial (Feature 79-39, Burial 11) at a depth of 91 cm occurs along the north wall of the square. Two biface fragments, a modified flake, a unifacial pitted mano fragment, and a piece of unmodified hematite are associated with Feature 79-40.

*FEATURE 79-41 (Figures 11 a, 32)*

This concentration is along the central part of the west wall of N24-E12. It is 101-107 cm below ground surface (Stratum IIb). The feature consists of yellowish gray clusters of ash intermixed with orange baked clay, shell, and bone flecks. It has a diameter of 45 cm. It is possible that this feature is associated with Feature 79-40.

*POSTMOLDS*

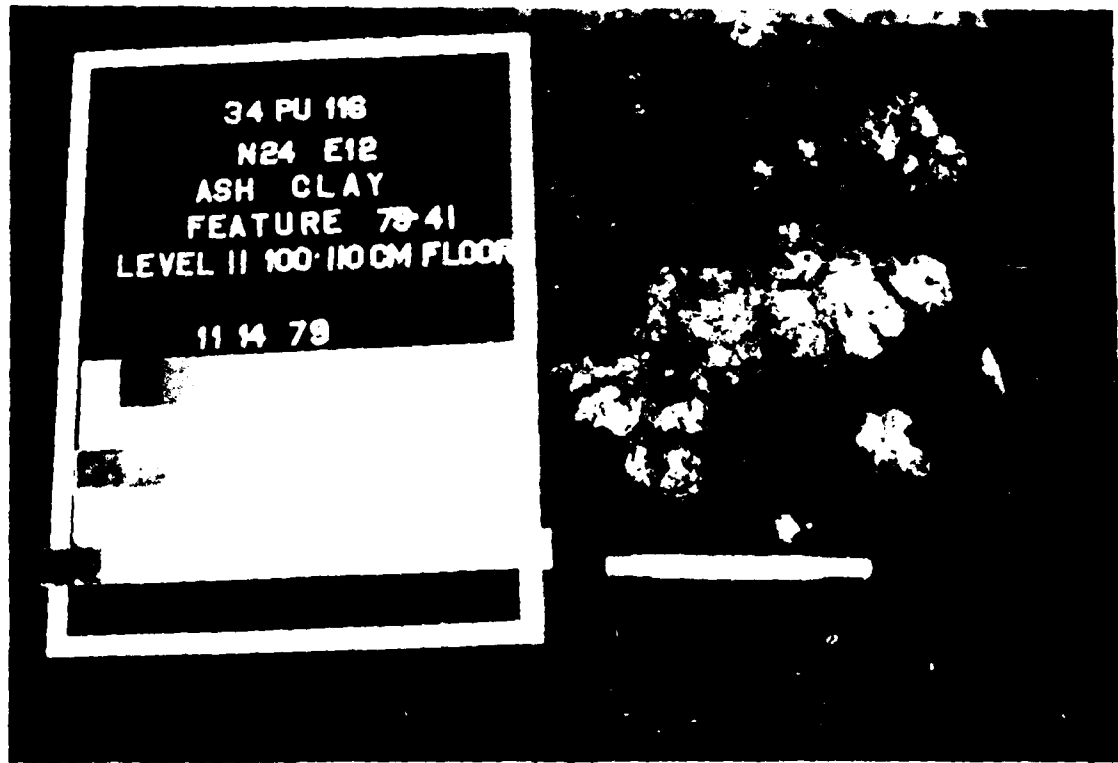
Many of these were difficult to distinguish because of the dark nature of the sediments and may have originated above the level in which they were recorded. The average depth is 110 cm.

*FEATURE 79-5 (Figure 32)*

Two possible postmolds identified by fairly sharp, circular stains are at a depth of 84 cm (Stratum IIb) in the northeast part of N28-E12.

Figure 11. a: Feature 79-41, ash/clay concentration, in N24-E12.

b: Feature 79-16, Burial 4, in N16-W0.



A



B

The fill of each postmold is darker, looser, and contains higher concentrations of baked clay and charcoal than surrounding areas. Along the west wall of the square, there are two large dark areas of baked clay and charcoal flecked soil which may be related to the postmolds. The postmolds have a diameter of 16-18 cm, but their depth and profile is unknown since they were not cross sectioned.

*FEATURE 79-10 (Figure 33)*

Twelve postmolds were identified at a depth of 110 cm (Strata IIB-III) in N28-E12. All have a dry, compact gray lining on one side (usually the west side). The gray clay has pieces of charcoal, small amounts of shell, and reddish orange baked clay in it. The postmolds are concentrated throughout the eastern half of the square in a north-south direction and cover an area of approximately 56 cm x 88 cm. They are numbered from south to north. Postmolds 8 and 11 may reflect the lower part of postmolds recorded as Feature 79-5. Postmold 1 is in the southern wall of the square and measures 9 cm x 16 cm. Its cross section suggests that it has straight sides, a straight base, and is 4 cm deep. The area beneath the postmold is disturbed. The second postmold has a diameter of 13 cm and is 16 cm deep. The sides are straight and the bottom is rounded. Krotovina disturbance occurs along its western edge. The third dark stain has an average diameter of 18 cm and a depth of 9-11 cm. It has an irregular outline which may reflect rodent disturbance. Postmold 4 has an average diameter of 12 cm, but in its center is a circular area of more concentrated charcoal and clay flecking. This area has a diameter of 7 cm. The cross section suggests a depth of 14 cm with tapering sides, straight base, and extensive krotovina disturbance. Postmold 5 is well defined with a diameter of 11 cm and a depth of 16 cm. Its sides are straight and taper to a pointed base. Postmold 6 has an elongated shape and is extensively disturbed by rodent activity resulting in an irregular outline. It measures 10 cm x 16 cm and is 7 cm deep. Postmold 7 is circular and measures 10 cm x 13 cm across the top and is 4 cm deep. The sides and base are straight. The eighth postmold may relate to Feature 79-5. It has a diameter of 9 cm x 18 cm, straight sides, and a depth of 8 cm. However, the bottom is irregular and may reflect rodent disturbance. Apparently, this same disturbance affects Postmold 9 which is circular in outline, has a diameter of 17 cm, depth of 8 cm, and straight sides tapering to an irregular base. Postmold 10 has an oval outline and measures 12 cm x 15 cm with a depth of 7 cm. Its sides are straight and taper to a straight base. Minimal disturbance is evident at the base. The eleventh postmold has a diameter of 15 cm and is 6 cm deep. The cross section indicates that it has straight sides which taper to a convex base. One side is rodent disturbed. An additional dark disturbance (designated as Postmold 12) was noted in the east wall of the square. The sides are straight but expand toward the convex base. The upper fill is compact sandy loam and the bulbous base has compact gray clay.

*FEATURE 79-14*

This feature consists of four postmolds at a depth of 120 cm (Stratum III) in N28-E2. They occur in the north-central part of the square and are aligned in a straight to slightly curved east-west line (175 cm in length). They are all circular in outline and are characterized by a compact circular ring of soil containing charcoal flecks. They average 8-10 cm in diameter and are 3-4 cm deep. The first three postmolds are about 10 cm apart while the fourth one is 60 cm from the third postmold.

*FEATURE 79-23 (Figure 33)*

This feature consists of four postmolds oriented in an arc in a southwest-northeast direction across N28-E14 at a depth of 100 cm (Stratum IIb). The postmolds are darker and softer than the surrounding matrix and contain baked clay and charcoal flecks. An expanding stemmed point fragment was adjacent to the third postmold, and a biface fragment was recovered from its fill. They are similar to Feature 79-10 by having a compact crescent of soil around their west or southwest sides. The first postmold (southwest corner) has a diameter of 15 cm, a depth of 10 cm, and straight sides tapering to a pointed base. The second postmold has more irregular sides and a straight base. It is 14 cm deep and has a diameter of 11 cm. The third postmold is 12 cm deep and has a diameter of 12 cm. The sides are convex and the base is rounded. The last postmold (northeast corner) is 9 cm in diameter and 11 cm deep. The sides are straight but its outline is slanted. It has a rounded base.

*FEATURE 79-25 (Figure 33)*

This is a single postmold, 120 cm deep (Stratum IIb), in the northeast quarter of N28-E14. It has a circular outline with a diameter of 14-15 cm. The postmold has a light gray loam fill with a very compact ring containing charcoal and baked clay around it. It is 5 cm deep with straight sides and a convex base.

*FEATURE 79-28 (Figure 33)*

This feature is composed of a mixed charcoal and ash fill along the northern wall of N28-E14. It is at a depth of 130 cm (Stratum III) and was directly below Feature 79-26 which may be a hearth. The postmold has a diameter of 16-18 cm and is 6 cm deep. Its sides are straight and taper to a rounded base.

*FEATURE 79-29 (Figure 33)*

This is the deepest postmold recorded at the site. It was found at a depth of 150 cm (Stratum III) in the northeast corner of N28-E14. The postmold contained a gray charcoal and ash mottled fill which is

softer than the yellowish brown silt loam matrix surrounding it. The top is oval and the cross section reveals even sides which taper to a convex base. It measures 12 cm x 16 cm and it is about 12 cm deep.

*FEATURE 79-37 (Figure 32)*

This number was assigned to a postmold which may be a krotovina. The disturbed area is in the southeast part of the northwest quarter of N26-E10 at a depth of 84 cm (Strata IIa-IIb). An ash/clay clump is along the west wall. The feature is irregular in plan view as well as the cross section. It measures 11 cm x 15 cm and is 4 cm deep.

*FEATURE 79-42 (Figure 33)*

This number was assigned to two postmolds occurring between 108-110 cm (Strata IIa-III) in the east half of N26-E12. Both are circular in plan outline and are characterized by baked clay and charcoal flecks in their loose, brown soil. They are similar to postmolds described in Features 79-5 and 79-10 by having a dark circular area (between 10-15 cm) of looser soil with a compact gray soil zone along one side of the postmolds. Their proximity to an ash/clay concentration (Feature 79-40) in N26-E12 and alignment with Features 79-5 and 79-10 indicate that these features may be components of larger, single feature. Both have diameters of 9 cm and are 6 cm deep. They have even sides and slightly convex bases. The second postmold has a disturbed area to its east.

PITS

*FEATURE 79-12 (Figure 31)*

This feature is in the northeast quarter of N28-E2 and was first defined at a depth of 80 cm (Stratum IIb). It measures 33 cm x 40 cm and is 9 cm deep. Its plan view is oval to circular and the cross section indicates even sides tapering slightly toward the bottom which is convex (basin-shaped). The pit fill is a very dark loam with charcoal interspersed throughout. Two postmolds (Feature 79-11) occur in the southwest corner of the square. The two areas are connected by continuous heavy to light concentrations of ash and baked clay. This perhaps indicates an occupational surface.

*FEATURE 79-18*

This feature was noted at a depth of 108 cm (Stratum III) in the east wall profile of N28-E12. Its maximum length is 46 cm and it has a depth of 35 cm. The cross section suggests the sides are even and the base is convex. Rodent disturbance occurs along one side and part of Feature 79-10 (Postmold 12) is along the other side. The levels

above this feature are characterized by ashy lenses, and Feature 79-17 is 28 cm above it. Small flecks of charcoal may be associated with the pit fill.

## BURIALS

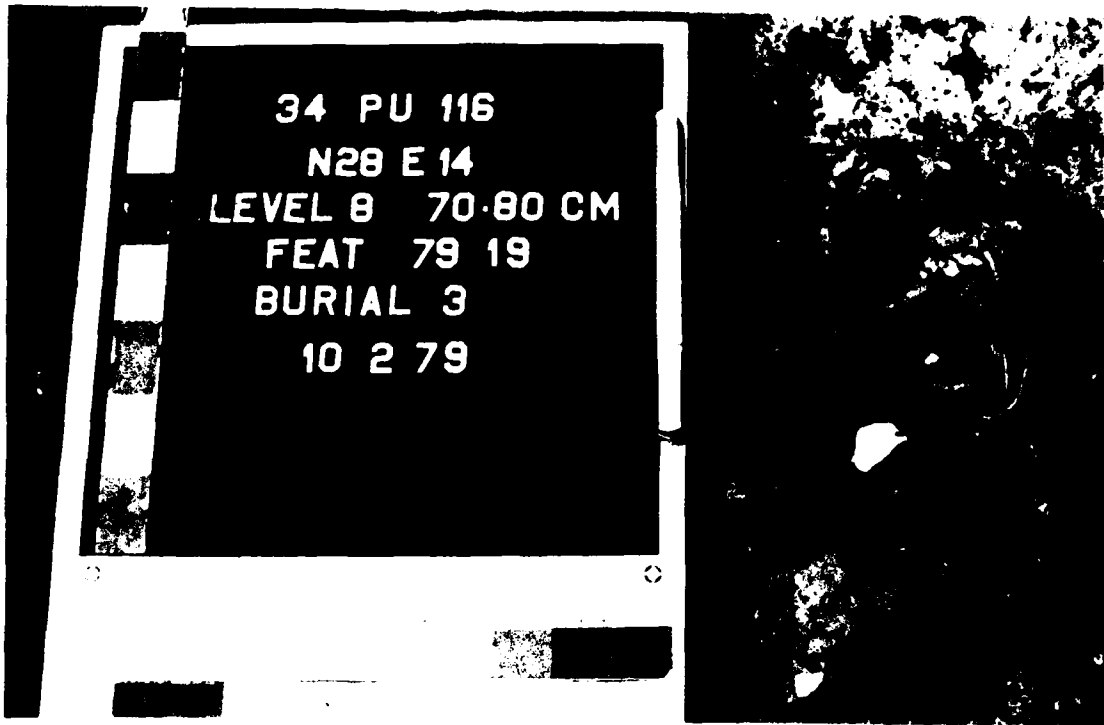
Eleven feature numbers were assigned to human interments ranging from 46-110 cm in depth with an average depth of 72 cm. The majority were in the east-central part of the site. Rodents and other types of bioturbation severely disturbed six burials, two were moderately disturbed, one was slightly disturbed, and disturbance could not be determined on two. The preservation of skeletal remains was judged to be poor in one instance, good in eight, and two were moderate to good. Body position could be determined on only six individuals. These were all flexed burials with four being on their side and two face down. Skull and body orientation was determined from seven burials. Three skulls were oriented to the east, two to the south, and one each to the north and northeast. Body orientations consisted of three north-south, two east-west, and one northwest-southeast. The body of one individual (Feature 79-39, Burial 11) is twisted so the upper torso is oriented east-west and the lower north-south. Burial pits, for the most part, were either absent or could not be discerned in the surrounding dark sediments. Burial goods, with rare exceptions, are not directly associated with individual interments. Table 4 presents a listing of artifacts and remains derived from residue sorts of matrices surrounding the burials. Only one burial could be sexed. Burials 3, 5, 8, 10, and 11 were aged using regression tables provided by Ubelaker (1978: 48-49). The age of Burial 4 was determined by dentition charts (Brothwell 1965: 65), and ages of Burial 7 and 9 were determined from charts provided by Ubelaker (1978: 47, 112-113). Burials 1, 2, and 6 could not be aged.

### *FEATURE 79-4, BURIAL 1*

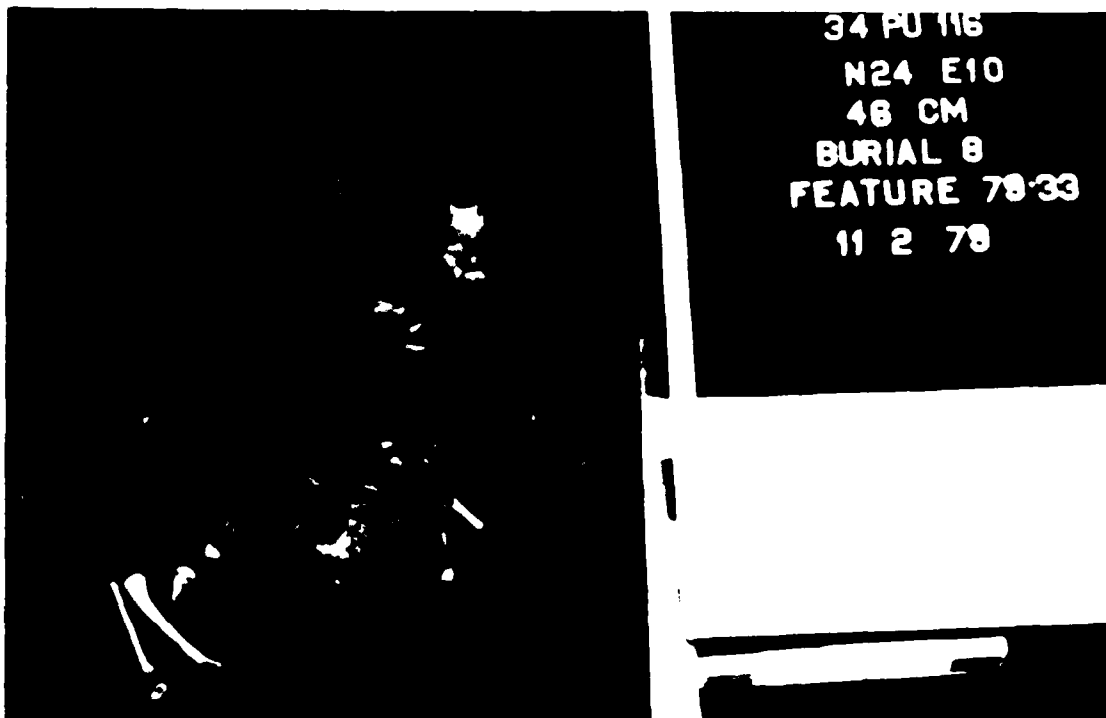
Burial 1 consisted of one skull fragment (occipital) in the west wall of N28-E12 at a minimum depth of 70-74 cm below ground surface (Stratum IIa). This individual may have been placed in a burial pit originating at least 45 cm below surface and extending to a depth of 77 cm. A soil disconformity, 33 cm wide with a U-shaped bottom in the west wall, may reflect the burial pit (Figure 8c). Scattered fragments of another individual (possibly Burial 2) occurred throughout the 70-80 cm level. The direction of the skull associated with Feature 79-4 is to the east and the body may have an east-west orientation even though the majority of the burial extends into an adjacent unexcavated square.

Age and Sex: The sex of Burial 1 is undetermined, but it is believed to represent an infant.

Figure 12. a: Feature 79-19, Burial 3, in N28-E14.  
b: Feature 79-33, Burial 8, in N24-E10.



A



B

*FEATURE 79-8, BURIAL 2*

This burial is represented by the bilateral frontal skull with superior portions of both orbits. It occurred at a depth of 74 cm (Stratum IIb) in the southeast corner of N28-E12. Burial 1 is at a similar depth in the west wall of this square. Other skeletal remains in this level are probably associated with Burial 2. There is no indication of a burial pit and neither body orientation nor head direction could be determined.

Age and Sex: Undetermined, but it may represent an infant or young juvenile.

*FEATURE 79-16, BURIAL 4 (Figure 11 b)*

This poorly preserved flexed burial was at the bottom of a circular to oval basin-shaped pit extending west from the central part of the east wall in N16-W0. The pit is composed of dark brown loam sediments surrounded by lighter yellowish brown loam. It measures 73 cm x 89 cm, and was first noted at a depth of 92 cm and extends to a depth of 105 cm (Stratum IV). It is probable that the pit originated at a higher depth, but rodent activity and the dark sediments hampered its identification above 92 cm. A biface fragment and four flakes were recovered next to the pit.

Age and Sex: The sex of this individual could not be discerned. Its age, based on the teeth, is 6-9 months.

Radiocarbon Date: A date of  $2830 \pm 70$  B.P. or  $880 \pm 70$  B.C. (Beta-1422) was obtained from the pit fill, and is believed to accurately reflect the age of the burial.

A major soil disturbance consisting of yellowish clay loam mottling in light to dark brown sediments was noted in Level 7 (60-70 cm). The yellowish clay loam mottling is predominant in subsequent levels, and the burial pit terminated in a yellowish brown loam. It is probable that the mottling in Level 7 reflects fill removed in preparing the burial pit. Based on this evidence, as well as stratigraphic radiocarbon dates of  $612 \pm 70$  B.C. (Beta-1415) from Level 8 (70-80 cm) in N28-E2 and  $993 \pm 75$  (Beta-1416) from Level 9 (80-90 cm) in N24-E10, a date of  $880 \pm 70$  B.C. would not be unreasonable.

*FEATURE 79-19, BURIAL 3 (Figure 12 a)*

This individual represents a prenatal infant with the skull oriented to the north and the flexed body in a north-south axis. It was at a depth of 67 cm (Stratum IIa) in the east central portion of N28-E14. The burial consists of 175 assembled bones including the skull with a few teeth, the right and left mandible, most of the vertebrae and ribs, and the entire pelvis was present in six pieces.

The only long bones were those of the left side. All the bones were confined to a 20 cm x 35 cm area. The surrounding area was severely disturbed, but a large (90 cm x 120 cm) irregular pit may be present. Fragments of this individual also occurred in Level 6 (60-70 cm).

Age and Sex: Sex could not be determined, but based on the long bones and ilium it is believed to be eight fetal months old.

Burial Associations: Two shell pendants were in association. One, a conch shell pendant, was above the pelvis. A mussel shell pendant was below the pelvis. Two flakes were in the burial fill.

Radiocarbon Dating: A radiocarbon sample derived from the burial matrix resulted in a date of  $3334 \pm 105$  B.P. or  $1384 \pm 105$  B.C. (Beta-1423). This date is considered to be too early for the burial and its stratigraphic position. Other samples from similar stratigraphic levels suggest a range of  $350 \pm 55$  B.C. (Beta-1414) from N24-E10 in Level 7 (60-70 cm) and  $612 \pm 70$  B.C. (Beta-1415) from Level 8 (70-80 cm) in N28-E2. The disturbed nature of the sample associated with Burial 3 may be due to the bioturbation of sediments around the burial.

#### *FEATURE 79-22, BURIAL 5*

This burial is between 77-80 cm (Stratum IIb) in the northeast quarter of N28-E14. An ash/clay concentration (Feature 79-17) is at a depth of 74-80 cm in the southwest quarter of the square, and Burial 3 (Feature 79-19) is about 10 cm above Burial 5. The sediments surrounding the burial are softer and darker than the rest of the level and may either indicate a burial pit or reflect severe rodent disturbance. The skeleton consisted of 30 pieces of bone including portions of the skull, mandible, three teeth, vertebrae, ribs, pelvis, and tarsals. The remainder of the burial may be in adjacent, unexcavated squares. The body appears to be flexed on its right side and oriented north-south. The direction of the skull may be to the south.

Age and Sex: Based on the ilium, the age is estimated to be 12 months. Its sex could not be determined.

#### *FEATURE 79-24, BURIAL 6*

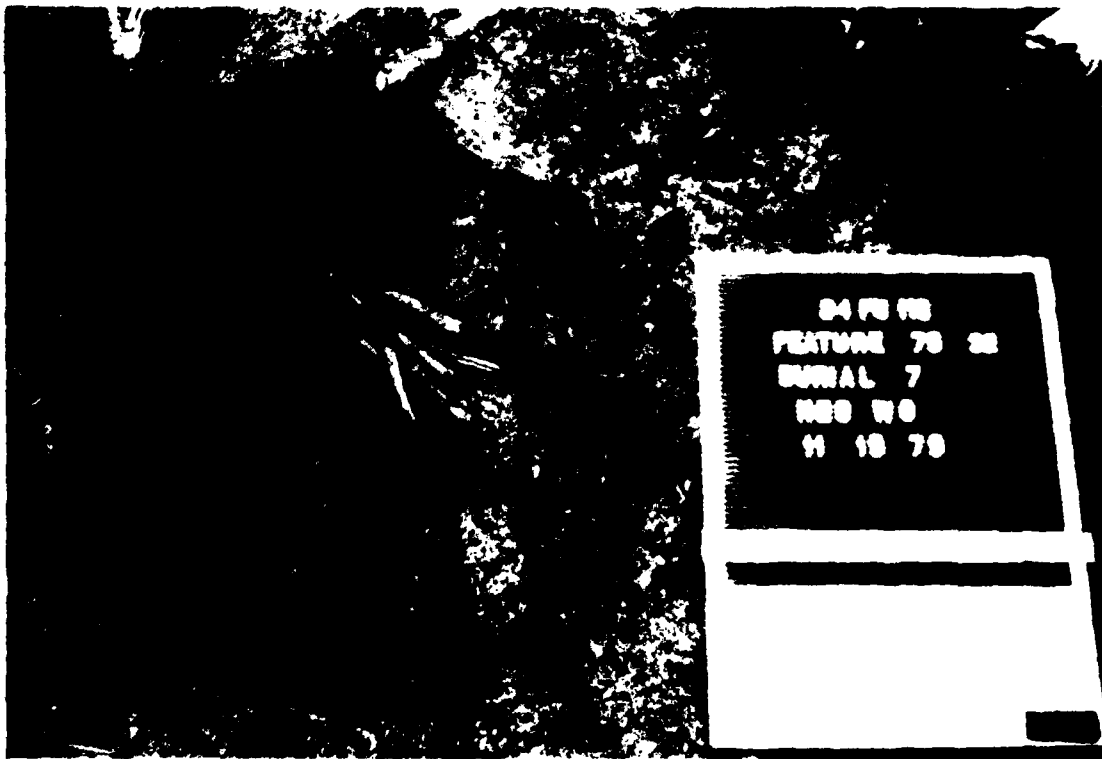
This burial is at a depth of 97 cm (Stratum IIb) in the northwest quadrant of N28-E14. Four postmolds (Feature 79-23), oriented in a southwest-northeast direction across the square, are at a depth of 100 cm. Only 13 pieces of bone including the sternum, ribs, carpals, metacarpals, and parts of the pelvis were recovered. The rest of the skeleton is assumed to be north of N28-E14. There is no discernable pit.

Age and Sex: This is an adult burial of undetermined sex.

- Figure 13. a: Cross section of Feature 79-32, Burial 7,  
in N28-W0.
- b: Burial goods associated with Feature 79-32,  
Burial 7, in N28-W0.



A



B

Comments: A radiocarbon date of  $3360 \pm 70$  B.P. or  $1410 \pm 70$  B.C. (Beta-1417) was obtained from a stratigraphic sample from 90-100 cm in N24-E10, and may suggest an age for this burial.

*FEATURE 79-31, BURIAL 7 (Figure 13 a-b)*

This burial consists of the charred and calcined fragments of a cremation found at a depth of 110 cm (Strata IIb-III) in the northeast part of N28-W0. Extensive disturbance in Levels 7-8 (60-80 cm) may relate to the burial. The human remains were in an irregularly shaped (hourglass or Figure 8) pit which measures 72 cm x 84 cm and is at least 20 cm deep. The pit is oriented in a northwest-southeast direction with the southeast end extending into the east wall of the square. The northwest end is shallow and basin-shaped while the southeast end, also basin-shaped, is deeper. The edges of three-quarters of the pit have a dark reddish brown stain. Three distinct clusters of charred and calcined bones were in the northeast part of the pit. These consisted of 705 pieces of mostly unidentifiable bones, but also portions of the skull, teeth, mandible, carpals, metacarpals, phalanges, and long bones. Many bones exhibited curved transverse fracture lines which suggest this individual was cremated in the flesh, and the fact that three distinct clusters of bone are present indicates a secondary deposition. A number of burned artifacts were mixed with the human bone. However, southwest of the human bone clusters, but within the pit, a number of unburned bone artifacts were recovered. It is believed they were buried with the cremation. This further strengthens the argument for a secondary burial with the individual being cremated in a different location.

Age and Sex: This individual is estimated to have an age of more than 50 years, but its sex could not be determined.

Burial Associations: Artifacts associated directly with the clusters of bone were a broken contracting stemmed point, perforated canine pendants, antler fragments, and miscellaneous animal bones. The canine pendants were charred and calcined. These were interspersed among the skeletal remains and may be personal adornment items that were burned when the body was cremated. The bone tools southwest of the human remains were a split deer metapodial, two antler billets, one worked antler fragment, and three bone tubes. One of the tubes was cross-hatched on both ends (Figure 26 m). One bone tube is believed to be from a large bird and the other two are femurs of a large carnivore. In addition, a large contracting stemmed point and modified flakes were recovered. Even though a small amount of charring is present at the ends of the bone artifacts, none were calcined. This suggests they were placed with the burial after cremation.

Radiocarbon Dating: Charcoal from the burial pit was submitted for dating. The results indicate a date of  $2238 \pm 70$  B.P. or  $288 \pm 70$  B.C. (Beta-1424). This date does not conform to its stratigraphic position.

However, if the burial pit was initiated at a higher level as may be indicated by disturbance in Levels 7-8 (60-80 cm) the date may reflect this. A radiocarbon sample derived between 60-70 cm in N24-E10 is dated at  $350 \pm 55$  B.C. (Beta-1414), and the range of the date from the burial overlaps.

*FEATURE 79-33, BURIAL 8 (Figure 12 b)*

This burial was in the southwest quarter of N24-E12 at a depth of 46 cm (Stratum IIa). There is no indication of a burial pit, but the skeletal remains occurred over a 42 cm x 50 cm area. The body was lying on its right side in a flexed position with the face down. It was oriented north-south with the skull being to the south. Portions of the left side of the body were slightly charred. Bone preservation is good, but rodent disturbance has removed much of the face, pubis, hands, and feet. The burial contained 215 pieces of bone including most of the calvarium, mandible, 12 teeth, vertebrae, ribs, scapulae, clavicles, long bones, and a few metatarsals and phalanges. There were no burial associations.

Age and Sex: The sex of this individual could not be determined. Based on the long bones, it is estimated to be 9-12 months old.

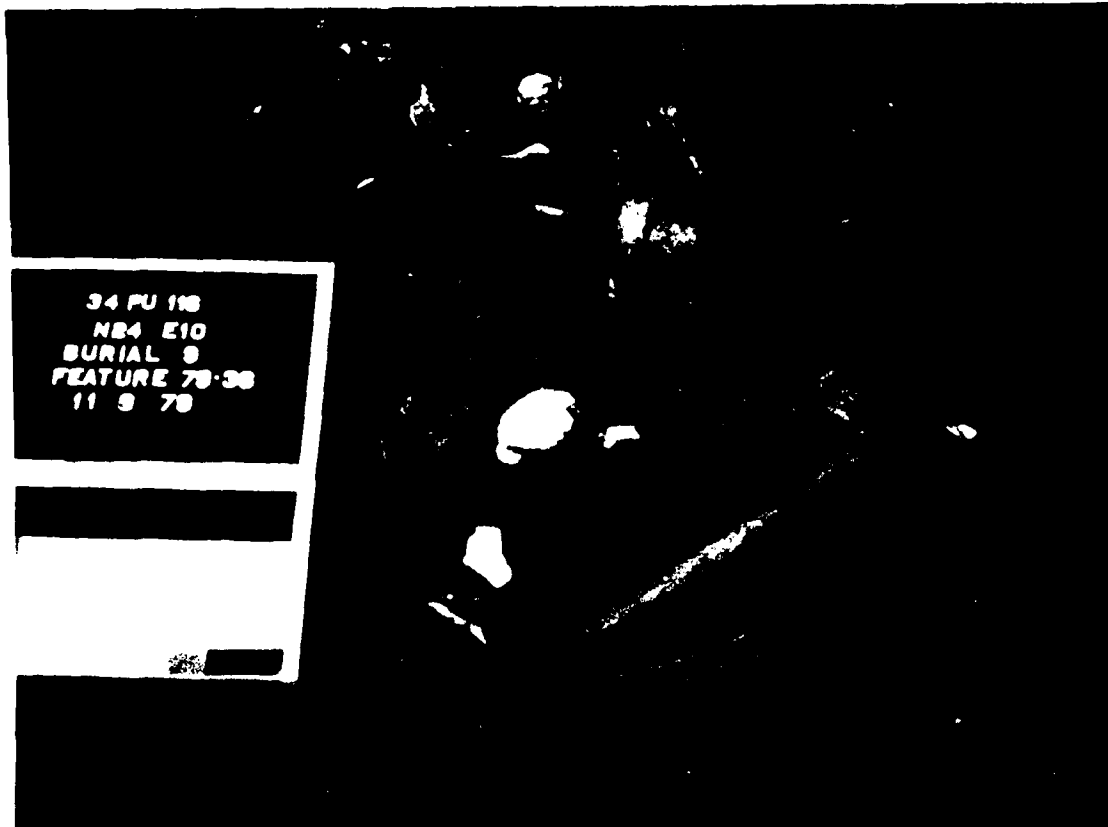
Pathology: This burial has evidence of osteitis with sinus formation on the right scapula and humerus, both ulnae, radii, tibiae, 20 vertebral bodies, and three parts of the skull. The tables of some fractured pieces of the skull are obliterated by osteitis with re-growth of bone. A defect (perforation) in the skull is the result of post-mortem erosion, but probably was caused by weakening the bone integrity as a result of pre-mortem infection. Even though the specific cause of death cannot be determined, a pyogenic infection with hematogenous spread affecting much of the body probably resulted in death.

Comments: This burial is less than 1 m west of Feature 79-36 (Burial 9).

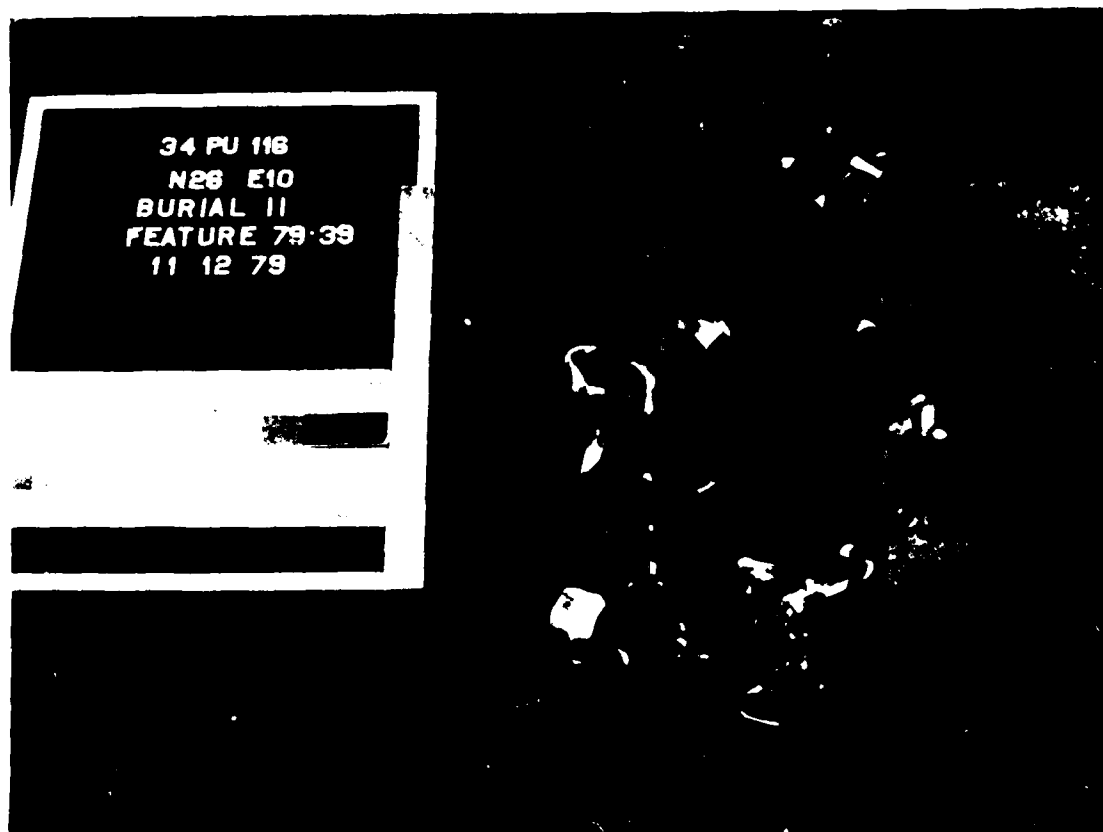
*FEATURE 79-36, BURIAL 9 (Figure 14 a)*

This is a single, primary interment at a depth of 65 cm (Stratum IIa) in the southeast corner of N24-E12. There was no discernable burial pit and no directly associated artifacts. The preservation of the bone is good, but the skull, vertebrae, lower arms, and ribs were severely disturbed by rodent activity. The skull was disarticulated with several pieces missing and the remainder scattered around the upper body. The skeleton is flexed on its right side with the body oriented northeast-southwest and the skull to the northeast. The skeleton consisted of 190 pieces including the right anterior and left posterior skull as well as the right facial, right and left nasal and maxillae, and parts of the left mandible. The post cranial skeleton consisted of two cervical, eight thoracic, three lumbar vertebrae, and

Figure 14. a: Feature 79-36, Burial 9, in N24-E10.  
b: Feature 79-39, Burial 11, in N26-E10.



A



B

a fragmented sacrum. Two clavicle fragments, scapula fragments, humeri, radii, ulnae, 12 carpals, 7 metacarpals, 13 phalanges, 13 ribs, 55 rib fragments, the body of the sternum, ilium, six ischium fragments, the right and left femur, tibia, and fibula were also recovered. There were also an additional eight skull fragments and 13 pieces of unidentifiable bone.

Age and Sex: This is an adult female, 31-35 years of age, and has an approximate stature of  $161.3 \pm 3.8$  cm.

Pathology: A number of pathologies are apparent. In the skull, the most severe pathology is a cavity, 16 mm x 24 mm, in the posterior of the left parietal (Figure 15 a-b). The edges of the cavity are well healed with new bone and indicate a post-mortem fracturing of osteophytes on the inner table. A narrow 5 mm long depression of the inner table adjacent to the cavity is also healed. Osteitis is also evident around the cavity and, although an erosive pyogenic process cannot be ruled out as a cause or contributing factor, the depressed inner table suggests a blunt, moderate trauma with subsequent infection and re-healing. An area of erosion and osteitis on the inner table near the left meningeal vessel increases in severity peripherally reducing the thickness of the skull and resulting in a post-mortem perforation of this area. The degree of healing around the cavity in the parietal compared to the lack of regeneration in the eroded area along the meningeal vessel precludes the likelihood that they are concurrent.

The petrous portion of the right temporal exhibits a perforation connecting the middle ear and cranial vault (Figure 15 f). This suggests an infection which has eroded superiorly through the roof of the middle ear and may be the cause of the infection along the meningeal vessel. It may also have been the direct cause of death.

Occlusal caries of the left and right first maxillary molars (Figure 15 c) resulted in buccal apical abscesses on both sides (Figure 15 d-e). A lingual apical abscess is also present on the right side. These abscesses are another potential source of meningeal infection.

Genetic anomalies include the absence of the right maxillary and left mandibular third molars. Based on the small size of the alveolar cavity, the left maxillary third molar is reduced. The second maxillary incisors on both sides are also genetically absent. In addition, a single post-cranial genetic anomaly consists of the partial sacralization of the fifth lumbar vertebrae.

An unexplained anomaly is the antero-lateral amputation of the styloid process of the right temporal. Two cut V-shaped notches occur 1-2 mm above the amputation. The lack of healing coupled with the difficult access to this position without damaging other portions of the skull suggest the amputation to be post-mortem. This, in addition to rodent activity, could also explain the disarticulation of the skull.

Burial Associations: Six biface fragments, four modified flakes, one flake scraper, one modified piece of hematite, seven miscellaneous worked bone, one worked antler, and one engraved bone were recovered in the matrix around the burial. Since a pit was not defined, these artifacts are probably associated with the general level and not the burial.

Radiocarbon Dating: A charcoal sample derived from the matrix surrounding the burial resulted in a date of  $2804 \pm 85$  B.P. or  $854 \pm 85$  B.C. (Beta-1166). This date does not correspond to its stratigraphic placement. Dates of  $350 \pm 55$  B.C. (Beta-1414) from 60-70 cm in N24-E10 and  $612 \pm 70$  B.C. (Beta-1415) from 70-80 cm in N28-E2 suggest the date for Burial 9 is too early. A large tree root in the southeast portion of the square as well as rodent disturbance may have affected the sample.

*FEATURE 79-38, BURIAL 10*

This is the only multiple burial from the site. Parts of three human skeletons were recovered in a possible pit measuring 60 cm x 90 cm. The pit extends into the east wall of N26-E12. It is 11 cm deep and was found at a depth of 87 cm (Stratum IIb). The 145 bones are well preserved but fragmentary and disturbed by rodent activity. Three of these are right parietal sections. There was also one complete calvarium, 11 teeth, and one femur. Due to the disturbed nature of the bones, body orientation and head direction could not be determined. Two postmolds (Feature 79-42) are a few centimeters west and an extensive ash/clay concentration (Feature 79-40) is below and west of the burial.

Age and Sex: One individual is estimated to be 2.5-3 years of age, another is believed to be an infant, and the third is either an infant or small child. The sex could not be determined.

Burial Associations: Two biface fragments, one pitted stone, and one mano fragment were found around the burial. Three bone beads were intermixed with the skeletal remains.

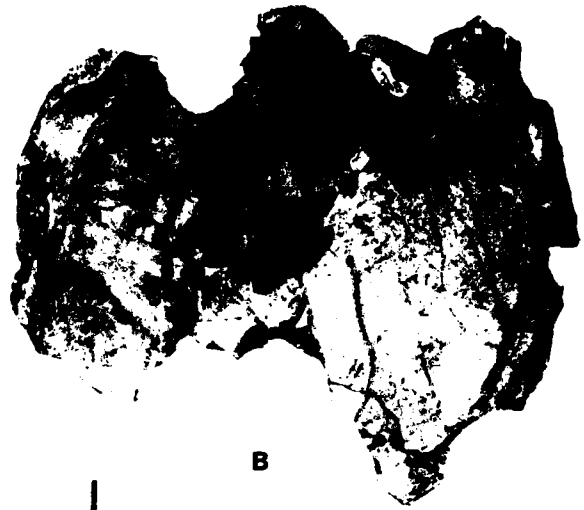
*FEATURE 79-39, BURIAL 11 (Figure 14 b)*

This represents a primary interment at a depth of 91-100 cm (Stratum IIb) in the northeast quarter of N26-E10. The body is flexed on its right side with the face down, and is twisted in such a manner that the lower torso is oriented north-south and the upper torso is east-west. The skull is to the east. The burial was moderately disturbed, but is represented by 48 well preserved pieces of bone including most of the left portion of the skull and right parietal. A permanent first molar with an enamel pearl between the buccal roots was also recovered. The post cranial skeleton consisted of parts of the sternum, clavicles, humerus, and carpals. The pelvis was in six pieces and the femur, tibia, fibula, tarsals,

- Figure 15. a-b: Cavity in the left parietal of Burial 9,  
Feature 79-36.
- c: Occlusal maxillary caries in Burial 9,  
Feature 79-36.
- d-e: Maxillary abscesses on Burial 9, Feature  
79-36.
- f: Perforation in right temporal of Burial 9,  
Feature 79-36.



A



B

10 CM



C



D



E



F

5 CM

metatarsals, and 20 ribs were present. The vertebral column is represented by five cervical, ten thoracic, five lumbar, and five sacral vertebrae. Intensive rodent activity disturbed the arms and removed portions of the face and right side of the skull.

Age and Sex: The sex could not be determined. The individual is 7-7.5 years old.

Burial Associations: An unmodified turtle carapace was beside the pelvis.

## V

### CULTURAL REMAINS

A variety of cultural remains were recovered during the 1979 investigations. Due to the large amounts and different types of materials, the numerical classification system used previously by the Clayton Lake Archaeological Project (Vehik and Galm 1979; Vehik 1982) is not employed here. Artifacts described in this report are divided into categories. However, to provide comparability, the numerical classification numbers used previously are in italics, whenever applicable, immediately after the category number or variety designation in the case of ceramics.

Point attributes and lithic nomenclature are from Binford (1963) and White (1963). Ceramic nomenclature and attributes are similar to those described by Brown (1971) and Irvine (1980). Color notations are from Munsell Soil Color Charts (1975). References to existing typological designations are made whenever possible (especially regarding point categories and ceramic varieties). Summary metric data for selected chipped and ground stone categories are in the Appendix. Individual artifact measurements and attribute data are on file at the Archaeological Research and Management Center in Norman.

#### CHIPPED STONE

##### *POINTS*

##### LARGE CONTRACTING STEMMED POINTS

Category 1 (01-01-01A) N=187 83 Complete, 104 Fragmentary (Figure 16 a-f)

These points have relatively pronounced shoulders, contracting stems, and predominantly convex bases. Only 28 specimens have straight bases, and eight basal configurations could not be determined. Blades are triangular with straight to slightly excurvate edges, and they are three times longer than stems. Tips are acute (77) or rounded (14). Breakage patterns include oblique (71), transverse (12), impact (9), and basal (7). Several specimens are also irregularly broken. Cross sections are either biconvex (164) or biplano (23). Heat spalls are evident on 10 specimens and small amounts of cortex occur on 21 artifacts. Primary flaking tends to be massive, bifacial,

and conchoidal. Retouch in the form of deep or light continuous and discontinuous flake scars occurs on the lateral edges of 94 specimens. One artifact has a slight amount of rounding along one edge. One extremely small specimen is a reworked proximal fragment.

Comment: These points are similar to the *Gary* type.

References: Bell 1958: 28, Pl. 14; Suhm and Jelks 1962: 197, Pl. 99.

#### LARGE EXPANDING STEMMED/CORNER-NOTCHED POINTS

Category 2 (01-01-02A) N=10: 3 Complete, 7 Fragmentary (Figure 16 g-h)

These artifacts have acute tips and triangular blade outlines with straight to slightly excurvate edges. Shoulders are prominent, rounded, in two instances slightly barbed, and they are the widest part of each specimen. Two stems are parallel and the rest are expanding. Four bases are straight, four are convex, and one is slightly concave. Primary flaking is large and conchoidal while secondary retouch consists of discontinuous, shallow flake scars (5), continuous, shallow flake scars (2), discontinuous, deep flake scars (2), and one specimen is not retouched. Four artifacts are obliquely broken at the tip, one has a transverse break, and the shoulders on two specimens are broken. One artifact has a small amount of cortex on the dorsal side. Cross sections are biconvex.

Comments: These specimens resemble *Lange* points.

References: Bell 1958: 36, Pl. 18; Suhm and Jelks 1962: 203, Pl. 103.

Category 3 (01-01-02B) N=5: 2 Complete, 3 Fragmentary (Figure 16 i-j)

These specimens have either shallow side notches or corner notches, expanding stems, and straight bases. One has a slightly convex base. They have triangular outlines with straight edges and acute tips. The shoulders are prominent and are the widest part of each specimen. The fragmentary artifacts are obliquely broken. Primary flaking is large, conchoidal and expanding. Only two artifacts have continuous or discontinuous edge modification. Cross sections are biconvex and none of the specimens have cortex.

Comments: These are similar to the *Ensor* type.

References: Bell 1960: 34, Pl. 17; Suhm and Jelks 1962: 189, Pl. 95.

Category 4 (01-01-02C) N=5: 3 Complete, 2 Fragmentary (Figure 16 k-l)

The tip of one specimen is obliquely broken and the other has a transverse break. Blade outlines are triangular with straight to slightly excurvate edges which are terminated by prominent shoulders (widest part). One tip is rounded and two are acute. Corner notches are relatively deep and broad. Stems are expanding and bases are concave. Cross sections are biconvex and there is no cortex. Two specimens have been heat spalled and an impact fracture is evident along the edge of one artifact. Primary flaking is relatively shallow, massive, conchoidal, and expanding. One specimen is retouched bilaterally and the remainder have unilateral retouch. For the most part, the retouch is discontinuous and light, but two specimens are deeply retouched.

Comments: These are most similar to *Edgewood* points.

References: Bell 1958: 20, Pl. 10; Suhm and Jelks 1962: 191, Pl. 96.

Category 5 (01-01-02F) N=6: 4 Complete, 2 Fragmentary (Figure 16 m-n)

These specimens have acute tips, triangular blade outlines with straight lateral edges, prominent unbarbed shoulders (widest part), deep corner notches, expanding stems, and convex bases. The tip on one specimen is obliquely broken and another exhibits a transverse break. The latter specimen may be thermally altered. Primary flaking is large, conchoidal and expanding. Light discontinuous retouch is present on two specimens, one has continuous deep retouch, and one has discontinuous deep retouch. One specimen has a slight amount of crushing along one edge. Cross sections are biconvex and cortex is absent.

Comments: These specimens are similar to the *Ellis* type.

References: Bell 1960: 32, Pl. 16; Suhm and Jelks 1962: 187, Pl. 94.

Category 6 (01-01-02G) N=20: 12 Complete, 8 Fragmentary (Figure 16 o-p)

Four specimens have oblique distal breaks, two have impact fractures, and the remainder are broken laterally along the shoulders. Blade outlines are triangular with acute tips and primarily straight lateral edges. Three specimens have straight to slightly excurvate edges and one has slightly serrated edges. The prominent and slightly barbed shoulders are the widest part. Stems are expanding and bases vary from convex (14) to straight (6). Two specimens are heat spalled and four have small amounts of cortex. Cross sections are biconvex except for one which is biplano. Primary flaking is either massive, conchoidal (9) or conchoidal and expanding (9), and two specimens have angular expanding flake scars. Secondary retouch is evident on

18 specimens. The most common is light discontinuous (10), four have light continuous, two have deep continuous, and one has discontinuous deep flake scars.

Comments: These artifacts are similar to specimens defined as the *Summerfield* type.

References: Galm and Flynn 1978: 167-168, Fig. 36, h-i.

Category 7 (01-01-02H) N=9: 1 Complete, 8 Fragmentary (Figure 16 q-r)

This category is distinguished from the preceding ones on the basis of prominent, barbed shoulders (widest part), narrow corner notches, expanding stems, and wide blades. Breakage patterns consist of oblique (5), transverse (2), and impact (1). Blade outlines are triangular with straight edges (6), two have slightly excurvate edges, and one has slightly incurvate edges. Basal configurations include straight (5), convex (2), concave (1), and indeterminate (1). Cross sections are biconvex. None have cortex. Primary flaking is massive and conchoidal and in two instances angular expanding. Edge modification in the form of retouch is evident on six specimens. This includes deep continuous (3), light discontinuous (2), and discontinuous deep (1). The single complete specimen has an acute tip.

Comments: These specimens conform to *Marcos* point descriptions.

References: Bell 1958: 42, Pl. 21; Suhm and Jelks 1962: 209, Pl. 105.

Category 8 (01-01-02I) N=13: 6 Complete, 7 Fragmentary (Figure 17 a-b)

These specimens have triangular blade outlines with straight to excurvate edges and acute to round tips. Breakage patterns include three oblique, three transverse, and one irregular. Three specimens also have impact fractures, and several are broken along a shoulder and one has a broken base. One specimen is heat spalled. The shoulders are the widest part and tend to be relatively prominent and barbed. This has resulted in deep corner notches. Stems are expanding and basal configurations consist of straight (6), convex (4), concave (2), and indeterminate (1). Primary flaking is massive conchoidal and in one case angular expanding. Continuous deep retouch is predominant (5) followed by light discontinuous (3), and discontinuous deep retouch (1). Four specimens are not retouched. Cortex is absent, and 12 have biconvex cross sections. One specimen is made from a flake which has no primary flaking, but is retouched along the blade edges. It has a biplano cross section.

Comments: These specimens are most similar to type descriptions given for *Marshall* points.

References: Bell 1958: 44, Pl. 22; Suhm and Jelks 1962: 211, Pl. 106.

Category 9 (01-01-02J) N=5: 5 Fragmentary (Figure 17 c)

These specimens have triangular outlines with predominantly straight to slightly excurvate lateral edges, prominent squared to rounded shoulders (widest part), shallow, broad corner notches, expanding stems, and convex (3), concave (1), or straight bases (1). All are obliquely broken either along the tip or blade, and one has impact fractures. Cross sections are biconvex, there is no evidence of cortex, and one is heat spalled. Primary flaking is large and conchoidal. Edge modification is absent except for light discontinuous retouch on one specimen.

Comments: These points are most similar to the *Yarbrough* type.

References: Bell 1960: 98, Pl. 49; Suhm and Jelks 1962: 261, Pl. 131.

Category 10 (01-01-02K) N=2: 1 Complete, 1 Fragmentary (Figure 17 d-e)

The tip and most of the blade of one specimen is broken by an oblique impact fracture. The other artifact has an acute tip, triangular blade with straight edges, wide prominent, well barbed shoulders, expanding stem, and concave base. Cross sections are biconvex. Cortex is absent. Primary flaking is massive, conchoidal and angular expanding. Secondary modification consists of deep continuous retouch.

Comments: These are similar to *Martindale* points.

References: Bell 1960: 70, Pl. 35; Suhm and Jelks 1962: 213, Pl. 107.

Category 11 (01-01-02N) N=8: 1 Complete, 7 Fragmentary (Figure 17 f-g)

Three specimens have triangular outlines and one has an acute tip. Blade edges are straight to excurvate. One specimen has slightly incurvate edges. The shoulders (widest part) are prominent and slightly barbed (4). Corner notching is shallow and broad, stems are expanding, and bases are convex (5), straight (2), or concave (1). Six specimens have oblique distal breaks and one has a transverse fracture. Two artifacts are thermally altered, none exhibit cortex, and all have biconvex cross sections. Primary flaking is predominantly massive, shallow and deep conchoidal (7), but one artifact has angular expanding flake scars. Edge modification is not evident on four specimens. The rest have light discontinuous retouch along the edges.

Comments: The closest similarity is to the *Williams* type.

References: Bell 1960: 96, Pl. 48; Suhm and Jelks 1962: 259, Pl. 130.

Category 12 (01-01-02T) N=6: 1 Complete, 5 Fragmentary (Figure 17 h-i)

The only complete specimen has a slightly rounded tip. The rest

Figure 16. Chipped stone implements from the Bug Hill site (34Pu-116).

a-f: Category 1

g-h: Category 2

i-j: Category 3

k-l: Category 4

m-n: Category 5

o-p: Category 6

q-r: Category 7



A



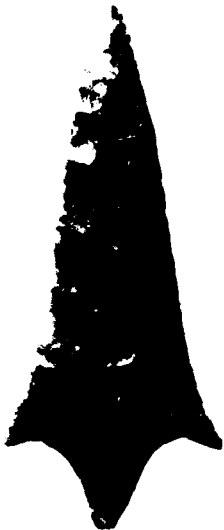
B



C



D



E



F



5 CM



G



H



I



J



K



L



M



N



O



P



Q



R

are either obliquely (3) or transversely (3) broken. Several are also broken laterally. Blade outlines are triangular with straight edges. The shoulders (widest part) are very prominent and characterized by long, square barbs which are often even with the base. These barbs result in deep, narrow corner notches. Stems are expanding and bases are straight (5) or convex (1). Cross sections are biconvex, and a small amount of cortex is evident on one specimen. Primary flaking is massive conchoidal, but angular expanding flake scars occur on two specimens. Three artifacts have light discontinuous retouch, one has deep continuous retouch, one has deep discontinuous retouch, and one is not modified.

Comments: These points are similar to the *Castroville* type.

References: Bell 1960: 14, Pl. 7; Suhm and Jelks 1962: 173, Pl. 87.

Category 13 N=2: 2 Complete (Figure 17 j-k)

The tip of one specimen is slightly rounded and the other is acute. Blade outlines are broad and ovate with excurvate edges. Shoulders (widest part) are prominent and in one instance are barbed. Corner notches are narrow and relatively deep. Stems are moderately short and expanding, and bases are straight. One has a biconvex cross section and the other is biplano. The latter specimen is heat spalled. Primary flaking is massive, shallow conchoidal. Secondary retouch occurs on one specimen and is light discontinuous. Cortex is absent.

Comments: This category roughly resembles the *Snyders* type.

References: Bell 1958: 88, Pl. 44.

Category 14 N=1: 1 Complete (Figure 17 l)

This specimen has an acute tip, triangular blade outline with straight edges, prominent shoulders (widest part), and one side with a large, shallow side notch while the other side is corner-notched. The base is slightly broken but appears to be expanding and slightly convex. There is no cortex and primary flaking is massive conchoidal. Small angular expanding flake scars occur along the edges, but there is no evidence of edge modification. It has a biconvex cross section.

Comments: This specimen cannot be assigned to any established point type.

Category 15 N=2: 2 Complete (Figure 17 m-n)

These specimens have acute tips, triangular blade outlines with excurvate edges, biconvex cross sections, and small shoulders (widest part). One has slightly barbed shoulders. Stems are short and expanding. One artifact has a convex base and the other is straight.

One specimen has a slight amount of cortex. Primary flaking consists of large, shallow conchoidal and angular expanding flake scars, and both have light continuous retouch along the edges.

Comments: This category is not similar to any known type.

Category 16 N=4: 4 Fragmentary (Figure 17 o-p)

These points have oblique distal breaks, straight parallel blade edges, prominent shoulders (widest part), slightly expanding (3) to parallel, narrow stems (1), and straight (3) to slightly convex bases (1). None have cortex and all have biconvex cross sections. Primary flaking is massive and conchoidal. Edge modification in the form of deep discontinuous retouch occurs on one specimen.

Comments: These artifacts cannot be assigned to an established type.

Category 17 N=8: 3 Complete, 5 Fragmentary (Figure 18 a)

These specimens have triangular blades with straight to excurve edges. The shoulders (widest part) range from prominent to weakly developed, and in one case they are barbed. Corner notches tend to be broad, stems are expanding, and bases are straight (7) and convex (1). Two tips are acute and one is rounded. Breakage patterns are oblique with several impact fractures. Several specimens also have mid-blade and lateral breaks. Thermal alteration is evident on four specimens, and cortex occurs on one artifact. Primary flaking is large conchoidal and secondary retouch occurs along the base of one specimen. One specimen has continuous flaking and crushing along the lateral edges and another artifact has continuous deep retouch. The remainder are not altered.

Comments: This category is not similar to any known types.

#### LARGE STRAIGHT STEMMED POINTS

Category 18 N=1: 1 Complete (Figure 18 b)

This specimen has a slightly rounded tip, triangular outline, prominent, squared shoulders (widest part), and slightly expanding stem with a straight base. There is no evidence of basal grinding or cortex. It has a biconvex cross section. Primary flaking consists of relatively large conchoidal and expanding flake scars. Secondary modification is bilateral and includes deep continuous retouch.

Comments: This specimen is most similar to *Table Rock Stemmed* points.

References: Perino 1968: 96, Pl. 48.

Figure 17. Chipped stone implements from the Bug Hill site (34Pu-116).

- a-b: Category 8
- c: Category 9
- d-e: Category 10
- f-g: Category 11
- h-i: Category 12
- j-k: Category 13
- l: Category 14
- m-n: Category 15
- o-p: Category 16



A



B



C



D



5 CM



E



F



G



H



I



J



K



L



M



N



O



P

Category 19 (01-01-04A) N=4: 1 Complete, 3 Fragmentary (Figure 18 c-d)

The fragmentary specimens have oblique distal breaks and the complete one has a rounded, possibly reworked, tip. Blade outlines are triangular and lateral edges are straight with either discontinuous (3) or continuous (1) light retouch. The shoulders (widest area) are prominent and squared. Stems are straight and three bases are convex and one is straight. One specimen has cortex at the base. Cross sections are biconvex. Primary flaking is predominantly massive, conchoidal, but one specimen has angular expanding flake scars.

Comments: These resemble *Carrollton* points.

References: Bell 1958: 12, Pl. 6; Suhm and Jelks 1962: 171, Pl. 86.

Category 20 (01-01-04C) N=1: 1 Complete (Figure 18 e)

This artifact has an acute tip and triangular blade outline with excurvate edges which terminate in prominent, moderately flaked barbs (widest part). Stem edges are parallel, but expand slightly toward the concave base. It has a biconvex cross section. Primary flaking is small expanding and conchoidal. Secondary retouch is deep and continuous. There is no cortex.

Comments: This may be a reworked point, but its closest similarity is to the *Shumla* type.

References: Bell 1960: 86, Pl. 14; Suhm and Jelks 1962: 247, Pl. 124.

Category 21 (01-01-04D) N=1: 1 Fragmentary (Figure 18 f)

This specimen has an oblique break at the tip. Its blade outline is narrow and triangular. The widest part is at the shoulders, one of which is square and the other is rounded. It has a parallel, rectangular stem and a straight base. There is no cortex and the cross section is biconvex. Edge modification is absent, but primary flaking consists of large expanding flake scars.

Comments: This category is similar to the *Bulverde* type.

References: Bell 1960: 12, Pl. 6; Suhm and Jelks 1962: 169, Pl. 85.

Category 22 (01-01-04E) N=4: 2 Complete, 2 Fragmentary (Figure 18 g-i)

The two fragmentary specimens have obliquely broken tips and one complete artifact has a rounded tip and the other is acute. Blade outlines are triangular with straight (2) to excurvate (1) edges. The widest part is at the shoulders which are prominent and unbarbed. Stems vary from straight to slightly expanding and two bases are straight and two are convex. Cross sections are biconvex, and a

slight amount of cortex is on each of the complete specimens. One artifact is thermally altered, probably heat treated. Primary flaking is massive, deep, and conchoidal. Secondary retouch is absent on one specimen, and on the rest it consists of deep and light continuous and discontinuous retouch.

Comments: These artifacts are similar to the *Palmillas* type.

References: Bell 1960: 74, Pl. 73; Suhm and Jelks 1962: 229, Pl. 115.

Category 23 N=1: 1 Complete (Figure 18 j)

This specimen has an acute tip and a triangular outline with straight lateral edges which are not beveled. The shoulders are slightly rounded and represent the widest part of the specimen. The sides of the stem are parallel, but they expand slightly toward the base which is convex. There is no cortex and the cross section is biconvex. Primary flaking is massive conchoidal, and secondary retouch along the blade edges is deep and continuous.

Comments: The stem of this specimen is not beveled, but its general configuration is similar to *Nolan* points.

References: Bell 1958: 66, Pl. 33; Suhm and Jelks 1962: 225, Pl. 113.

Category 24 N=5: 2 Complete, 3 Fragmentary (Figure 18 k-m)

These specimens have long, triangular blades with excurvate lateral edges and short, straight to slightly expanding stems with straight bases. One is transversely broken at the tip and two are missing barbs at the prominent shoulders (widest part). None have cortex, but one is extensively heat spalled. Cross sections are biconvex. Primary flaking is shallow, conchoidal and angular expanding. Edge modification consists of light discontinuous retouch along one edge of four specimens.

Comments: These specimens cannot be assigned to an established type.

#### SMALL EXPANDING STEMMED/CORNER-NOTCHED POINTS

Category 25 (01-01-06A) N=46: 18 Complete, 28 Fragmentary (Figure 19 a-e)

These specimens are deeply corner-notched with expanding stems. Blade outlines are triangular with straight or excurvate edges. Maximum width is at the shoulders which are prominent and in several cases slightly barbed. Breakage patterns at the distal end consist of 11 oblique and four transverse breaks. The remainder are either longitudinally broken or broken at the base or shoulders. Tips are either

Figure 18. Chipped stone implements from the Bug Hill site (34Pu-116).

a: Category 17

b: Category 18

c-d: Category 19

e: Category 20

f: Category 21

g-i: Category 22

j: Category 23

k-m: Category 24



A



B



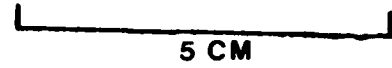
C



D



E



5 CM



F



G



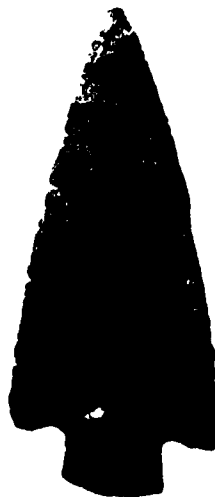
H



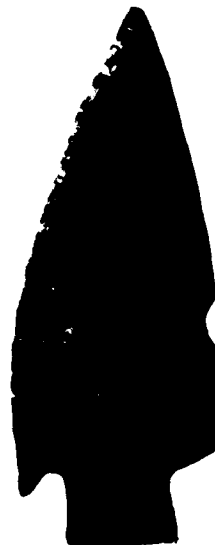
I



J



K



L



M

acute (26) or rounded (2). Bases are straight (32), concave (4), and convex (2). Five specimens are heat spalled and two have cortex. Cross sections are biconvex. Primary flaking is bifacial and diminutive. Secondary retouch consists of light discontinuous (16), light continuous (2), and deep continuous (2). Twelve specimens have serrated lateral edges.

Comments: Characteristics of these specimens conform most closely with those of *Scallorn* points.

References: Bell 1960: 84, Pl. 42; Suhm and Jelks 1962: 285, Pl. 143.

Category 26 (01-01-06C) N=4: 1 Complete, 3 Fragmentary (Figure 19 f-g)

These small points have acute tips, triangular blade outlines, deep corner notches, expanding stems, and either straight (2), convex (1), or concave (1) basal configurations. Lateral edges are either recurved (2) or straight (2), and the shoulders (widest part) are prominent and barbed. Three cross sections are biconvex and one is biplano. One specimen has part of the stem missing and two are obliquely broken near the tip. One of these is also broken along a shoulder. Flaking is bifacial and consists of fairly large angular expanding flake scars on three specimens and conchoidal flake scars on one artifact. Two specimens have slightly serrated edges, two have light discontinuous retouch, one has light continuous retouch, and one is not retouched. Cortex is not present.

Comments: These points are similar to the *Agee* type.

References: Brown 1976: 73, Fig. 14, a-r.

Category 27 (01-01-06D) N=7: 4 Complete, 3 Fragmentary (Figure 19 h-i)

These artifacts have acute tips and triangular blade outlines with straight (4), excurvate (2), or concave (1) lateral edges. Shoulders, at which maximum width is attained, are prominent and unbarbed. Stems are slightly expanding and have straight (5) or slightly convex (1) bases. Cross sections are either biconvex (6) or biplano (1). One artifact has a broken base and two have oblique distal breaks. Primary flaking is either massive conchoidal or angular expanding. Secondary retouch is not evident on two specimens, but on the others it is deep continuous (3) and light discontinuous (2). Cortex is not present.

Comments: These points are similar to the *Homan* type.

References: Brown 1976: 92-93, Fig. 17, i-n.

Category 28 N=1: 1 Fragmentary

The base appears to be convex and one shoulder is broken. It has

an acute tip and triangular blade with straight edges. The single shoulder is not prominent and the notches are relatively shallow. Primary flaking consists of large angular expanding flake scars, but there is no edge modification. It has a biconvex cross section and there is no cortex.

Comments: This specimen cannot be assigned to a known type.

#### SMALL EXPANDING STEMMED/SIDE-NOTCHED POINTS

Category 29 (01-01-07J) N=1: 1 Fragmentary

This small point has an acute tip, triangular outline, and straight edges. Even though one shoulder is broken, the other is very prominent and flares out at the base of the specimen. The base is very concave. It has a biconvex cross section. Primary flaking is small and conchoidal, but no secondary retouch is evident. Cortex is not present.

Comments: The characteristics of this specimen are most similar to those of *Toyah* points.

References: Bell 1960: 88, Pl. 44; Suhm and Jelks 1962: 291, Pl. 146.

Category 30 N=2: 2 Complete (Figure 19 j-k)

These points have sharp prominent shoulders above shallow side notches. They have acute tips, triangular outlines, and one has straight edges and the other has slightly excurvate edges. Stems are expanding and one base is concave and the other is convex. Cross sections are biplano, and neither specimen has cortex. Primary flaking is not evident on one artifact but the other has conchoidal flake scars. Edge modification consists of light continuous retouch on one artifact and deep continuous retouch on the other.

Comments: This category cannot be assigned to any recognized type.

#### SMALL PARALLEL/STEMMED CORNER-NOTCHED POINTS

Category 31 (01-01-09B) N=5: 4 Complete, 1 Fragmentary (Figure 19 l-m)

These specimens are distinguished by their size and parallel or straight stems and bases. One item has a slightly convex base. Other characteristics include acute tips, triangular blade outlines, straight lateral edges, relatively prominent shoulders (widest part), and broad corner notches. One specimen has a slight amount of cortex. Cross sections are biconvex (3) or biplano (2). The fragmentary

specimen is obliquely broken at the distal end. One specimen does not have primary flaking, but the rest have relatively large, shallow angular expanding flake scars. The edges of two artifacts are slightly serrated. Secondary retouch is deep continuous on three artifacts, deep discontinuous on one, and light continuous on one.

Comments: These points are similar to *Bonham* variety *Tahlequah* points.

References: Brown 1976: 65, Fig. 17, t-x.

#### DRILLS

##### SHAPED BASE DRILLS

Category 32 (01-02-01A) N=5: 3 Complete, 2 Fragmentary (Figure 19 n)

These specimens are made from reworked projectile points. Three have contracting bases with maximum width at the shoulders and are similar to Category 1. Tips are broken on two specimens and rounded on the third. Flaking is bifacial and deep continuous. Small discontinuous retouch is present on the drill elements of two specimens. Cross sections are biconvex and no cortex is present.

Two specimens have been fashioned from bifacially worked expanding stemmed/corner-notched points. Maximum width is at the shoulders which are weakly developed. Tip shapes are round and the drill element of one item has been reworked. Cross sections are biconvex and there is no cortex. Both items display stepped retouch/crushing along the basal margins which may indicate that they were hafted. One artifact has been thermally altered.

##### FLAKE BASE DRILLS

Category 33 (01-02-02A) N=8: 6 Complete, 2 Fragmentary

These items have thin, broad expanding bases which have an oval outline. Six have well defined bases which have been bifacially worked. Two specimens are unifacially worked. Drill elements are generally long and tip shapes include ovate (5), round (1), and broken (2). Deep continuous retouch is evident along the entire margin of seven specimens and polish is visible on flake scars and ridges of the drill elements of two items. None have cortex and they are not thermally altered.

Category 34 N=3: 2 Complete, 1 Fragmentary

These items are defined on the basis of their overall triangular shape, straight bases, and long, narrow drill elements. They are bifacially flaked and have biconvex cross sections. Although no polish is visible, deep continuous retouch is evident along the edges of the drill elements. Tips are acute, and no cortex is present.

*SCRAPERS*

FLAKE/UNIFACIAL SCRAPERS

Category 35 (01-05-02A) N=14: 14 Complete (Figure 19 o-p)

These specimens have steep unifacial flaking along distal edges (4) or lateral margins (10). Ten specimens, made from split cobble sections, have 10-80% cortex over the dorsal surface. The cortex is well-rounded and indicate these specimens were derived from water rolled cobbles. One split cobble and three large flakes do not have any cortex. The retouch along the distal edges is light continuous and consists of conchoidal and angular expanding flake scars. One of these also has had several large conchoidal flakes removed from the dorsal surface. Retouch on the laterally modified split cobbles ranges from deep continuous to light discontinuous removal of conchoidal and angular expanding flakes. Primary modification on two of these consists of large conchoidal flake scars on the dorsal surface. The laterally modified flakes are characterized by light continuous retouch along a single edge. Two specimens have plano-convex cross sections and the remainder have thick, irregular cross sections.

*DOUBLE BITTED AXES*

Category 36 (01-06-01A) N=1: 1 Complete (Figure 19 r)

This artifact is bifacially worked and has a well defined bilobed shape with regular edges and a central notch or hafting area. Cortex remnants, visible on both faces, are well rounded and suggest that it was produced from a tabular-shaped cobble which was water rolled. It has a biconvex cross section. Lateral edges along the haft area are dulled and crushed, possibly indicating that it was hafted. Distal and lateral edges are slightly rounded with a very light polish visible along some flake scars on the distal edge. Numerous hinge and step fractures are also visible. There is no evidence of thermal alteration.

*HOES*

## Category 37 (01-07-01A) N=2: 2 Fragmentary (Figure 19 q)

These items have polish and occasional striations oriented perpendicular to the working edge. One specimen has a rectangular outline with a straight working edge while the other has a convex working edge and a possible hafting area. They have biconvex cross sections, and are not thermally altered. Edges are regular and slightly rounded. Primary flaking is bifacial, massive and consists of angular expanding and conchoidal flake scars.

*BIFACES*

## COBBLE/QUARRIED BLOCK BIFACE I

## Category 38 (01-10-01A) N=40: 40 Complete (Figures 19 s; 20 a)

In general, artifacts in this category are believed to indicate initial modification activities. They exhibit ovate (8%), tabular (8%), and amorphous (84%) outlines which generally reflect the shape of the original parent material. Thick, irregular cross sections are prevalent, and they have extremely sinuous edges. Eight percent have cortex ranging from 20-60% of the surface. Thirteen percent are thermally altered. Flake scars are massive, conchoidal and angular expanding and numerous hinge fractures are apparent on 38% of the sample. Edge retouch or alteration is evident on 26 specimens and includes discontinuous angular expanding retouch (25%), continuous angular expanding retouch (19%), discontinuous conchoidal retouch (3%), and continuous small conchoidal retouch (3%). Four specimens have extensive edge damage/crushing along lateral margins (2) and distal edges (2).

## COBBLE/BLOCK BIFACE II/THICK BIFACE

## Category 39 (01-10-02A) N=159: 139 Complete, 20 Fragmentary (Figure 20 b)

This category consists of bifacially worked cobbles (129), split cobbles (16), and flakes (14) exhibiting some degree of shaping, and are believed to represent primary modification activities. Outlines include ovate (23%), rectangular (11%), triangular (10%), tabular (6%), and amorphous (50%). Cross sections are primarily thick, irregular (57%), but also include plano-convex (24%), biconvex (13%), and bi-plano (6%). Ninety-four percent exhibit less than 50% cortex, and 16%

have evidence of thermal alteration. Flake scars are generally massive conchoidal and angular expanding, and edge shapes range from sinuous to extremely sinuous. Edge retouch is visible along lateral and distal margins of 60 specimens. This includes light discontinuous conchoidal retouch (5), light continuous conchoidal retouch (7), continuous angular expanding retouch (9), and discontinuous angular expanding retouch (39). Two specimens from this group have extensive, continuous retouch along the entire margin and probably were used at this stage of reduction.

#### THIN BIFACE I

Category 40 (01-10-03A) N=102: 94 Complete, 8 Fragmentary (Figure 20 c-e)

These specimens generally exhibit more modification and shaping than the preceding categories. Outlines range from triangular (34%), ovate (25%), rectangular (21%), diamond shape (7%), to irregular (13%). More than 78% of these specimens have less than 10% cortex. Cross sections are uniformly thin and include biconvex (45%), plano-convex (46%), biplano (3%), and irregular (6%). Primary flaking is bifacial, large conchoidal and angular expanding. Edge shapes range from slightly sinuous to regular. Fourteen specimens are thermally altered and nine have numerous hinge fractures. Fifty-four percent display some degree of edge retouch/modification which occurs primarily along lateral margins. These include discontinuous angular expanding retouch (55%), continuous conchoidal retouch (27%), continuous angular expanding retouch (10%), and discontinuous conchoidal retouch (8%). Two specimens have continuous conchoidal retouch around small, tip-like projections. One artifact has extensive continuous conchoidal retouch along an entire edge and it may have been used as a scraper or knife.

#### THIN BIFACE IIA

Category 41 (01-10-04A) N=96: 60 Complete, 36 Fragmentary (Figure 20 f-h)

These specimens have regular edges, small conchoidal and angular expanding primary flake scars, and uniformly thin cross sections. They are believed to be derived from the preceding group and represent secondary modification activities. Outlines are better defined and include triangular (60%), rectangular (30%), diamond shape (6%), and ovate (4%). Cross sections are mostly biconvex (76%) with plano-convex (21%) and biplano (3%) also present. Ninety percent exhibit less than 10% or no cortex. Thermal alteration is less frequent (five specimens), and nine artifacts have extensive hinge fractures. Edge retouch is visible on 63%. It consists primarily of light and deep conchoidal retouch (45%) occurring along lateral and distal edges. Discontinuous angular expanding retouch is also present (30%) as well

Figure 19. Chipped stone implements from the Bug Hill site (34Pu-116).

a-e: Category 25

f-g: Category 26

h-i: Category 27

j-k: Category 30

l-m: Category 31

n: Category 32

o-p: Category 35

q: Category 37

r: Category 36

s: Category 38

NOTE: r displayed at 10 cm scale shown.



A



B



C



D



E



F



G



H



I



J



K



L



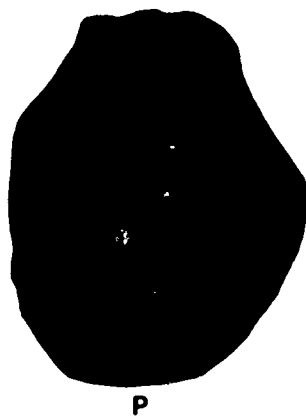
M



N



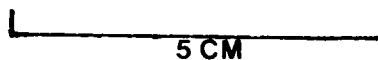
O



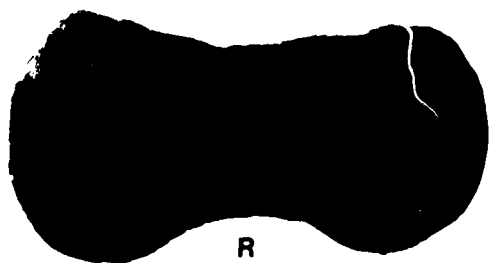
P



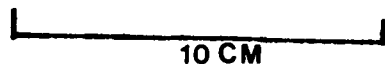
Q



5 CM



R



10 CM



S

as light and deep discontinuous conchoidal retouch (22%) and continuous angular expanding reotuch (3%). Three specimens have polish on flake scars and ridges along lateral edges (2) and the distal edge (1). Based on the size, shape, and uniformity of several specimens, it is possible that 17 may have served as preforms for larger projectile points and two specimens may be small point preforms. It is also probable that many of these artifacts were used as knives or scrapers.

#### THIN BIFACE IIB

Category 42 (01-10-05A) N=47: 26 Complete, 21 Fragmentary (Figure 20 i-k)

This category is similar to the preceding one with the addition of hafting elements. These specimens also are viewed as the result of secondary modification activities and are characterized by regular edges, uniformly thin cross sections, and little or no cortex. Basal configurations include contracting (88%), expanding with one or two corner notches (6%), straight with two side notches (2%), bulbous (2%), and concave (2%). Shoulders, when present, are weakly developed. Tip shapes are rounded (51%), acute (11%), and broken (38%). Two specimens with broken tips are impact fractured. Hinge fractures are relatively frequent (21%). Thirteen percent are thermally altered. Edge retouch is evident on 47% of the sample and includes light and deep continuous conchoidal retouch (41%) along lateral (9) and/or basal margins (3), discontinuous angular expanding retouch (27%) along lateral (4) and/or basal edges (2), light and deep discontinuous conchoidal retouch (18%) along lateral edges (4), and continuous angular expanding retouch (14%) along lateral (2) and entire edges (1). The retouch/crushing along basal edges may indicate that these artifacts were hafted. It is probable that many of these items were projectile point preforms which were used at this stage of reduction.

#### *POINT/BIFACE FRAGMENTS AND SEGMENTS*

Category 43 (01-12-01A) N=1696

These specimens represent unidentifiable fragments of point and biface categories discussed above. They are divided into proximal (34%), distal (23%), medial (21%), and indeterminate fragments (22%).

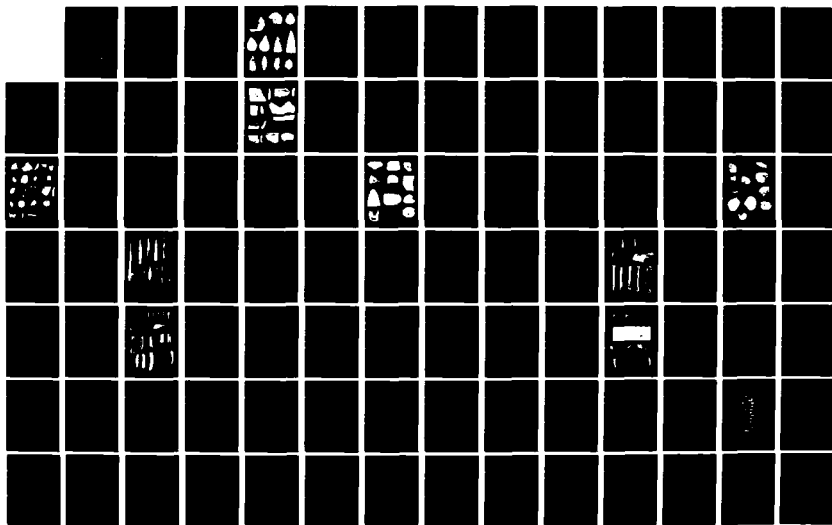
The proximal fragments include the following basal shapes: concave (2%), straight (20%), and convex (78%). Cortex is present on 1% of the sample and cross sections are primarily biconvex (94%). Edge retouch or modification is present on 59% of the sample. Based on size, shape, and degree of reduction, it is possible that 24% may be fragments of large contracting stemmed points (Category 1). Other

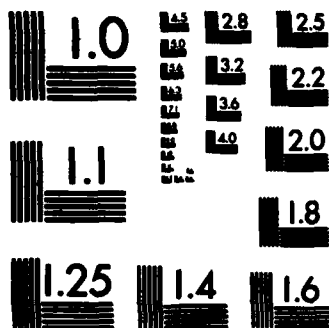
AD-A120 746 THE ARCHAEOLOGY OF THE BUG HILL SITE (34PU-116):  
PUSHMATAHA COUNTY OKLAHOMA(U) OKLAHOMA UNIV NORMAN  
UNCLASSIFIED ARCHAEOLOGICAL RESEARCH AND MANAGEMENT CENTER R VEHIK  
82 DACW56-78-C-0212 F/G 5/6

THE ARCHAEOLOGY OF THE BUG HILL SITE (34PU-116):  
PUSHMATAHA COUNTY OKLAHOMA(U) OKLAHOMA UNIV NORMAN  
ARCHAEOLOGICAL RESEARCH AND MANAGEMENT CENTER R VEHIK  
82 DACW56-78-C-8212 F/G 5/6

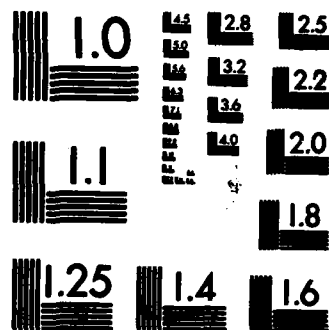
213

NL





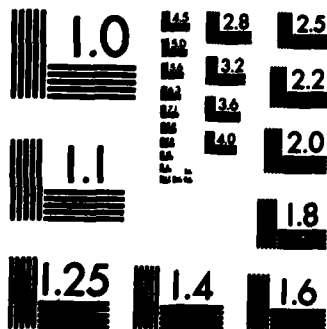
MICROCOPY RESOLUTION TEST CHART  
NATIONAL BUREAU OF STANDARDS-1963-A



MICROCOPY RESOLUTION TEST CHART  
NATIONAL BUREAU OF STANDARDS-1963-A



MICROCOPY RESOLUTION TEST CHART  
NATIONAL BUREAU OF STANDARDS-1963-A



MICROCOPY RESOLUTION TEST CHART  
NATIONAL BUREAU OF STANDARDS-1963-A



MICROCOPY RESOLUTION TEST CHART  
NATIONAL BUREAU OF STANDARDS-1963-A

possible point fragments include large expanding stemmed/corner-notched points, Categories 2-17, (8%), large straight stemmed points, Categories 18-23, (6%), and one large concave base point. Small point fragments (4%) may also be represented. Evidence of thermal alteration is present on 4%.

Distal fragments are characterized by acute (68%) and rounded tips (32%), and biconvex cross sections. Cortex is present on 1%. Edge retouch occurs on 84%, and 4% are thermally altered. Twenty-three percent may represent the distal segments of large points and 16% small points.

Medial fragments, including midsections and lateral segments, have the following characteristics: cross sections are biconvex (56%), plano-convex (3%), and indeterminate (41%); cortex is present on 1%; and retouch is observable on 84%. Two specimens have at least one corner notch and three items are small projectile point segments. Four percent are thermally altered.

Indeterminate fragments have biconvex (23%), plano-convex (3%), thick, irregular (4%), and indeterminate (70%) cross sections. Cortex is present on 1%, and retouch is evident on 51%. Sixteen percent are thermally altered.

#### *MODIFIED FLAKES*

These flakes (2317) have either been utilized or retouched. For the most part, they are assumed to have been intentionally "removed from a larger mass by the application of force" (Crabtree 1972: 64). Summary statistics for this class are presented in Table 5. Tables 6 and 7 provide horizontal and vertical distributions according to material type.

#### PROJECTIONS

Category 44 (01-13-01A) N=40: 30 Complete, 10 Fragmentary

These artifacts have sharp, retouched projections along the distal (31), lateral (5), or bilateral edges (4). Retouch is predominantly on the dorsal (22), bifacial (17), or ventral sides (1). Striking platforms are present on 30 specimens, and 24 have dorsal cortex.

**Figure 20. Chipped stone implements from the Bug Hill site (34Pu-116).**

**a: Category 38**

**b: Category 39**

**c-e: Category 40**

**f-h: Category 41**

**i-k: Category 42**

87



A



B



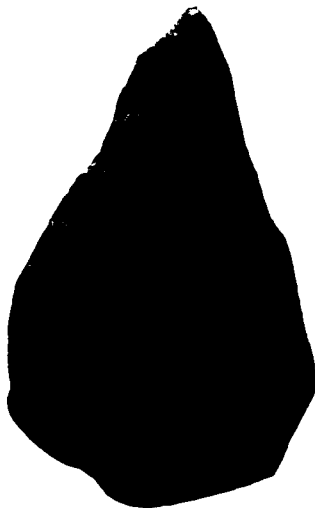
C



5 CM



D



E



F



G



H



I



J



K

Table 5. Summary statistics of modified flakes.

Modified Flakes	Type A		Type B		Type C		Type D		Type E		Type F		Type H		Type I		Total
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	
Total	1413	61	253	11	1	-	7	-	3	-	114	5	147	6	379	16	2317
Cortex Present	719	63	105	9	-	-	2	-	-	-	48	4	54	5	207	18	1135
Striking Platform:																	
Faceted	116	69	22	13	-	-	2	1	1	1	7	4	4	2	17	10	169
Plain	823	59	138	10	1	-	4	-	-	-	72	5	107	8	258	18	1403
Absent	474	64	93	12	-	-	1	-	2	-	35	5	36	5	104	14	745
Utilized and Retouched Edge/Edge Shape:																	
Straight	822	63	145	11	1	-	5	-	3	-	55	4	75	6	193	15	1299
Concave	194	60	29	9	-	-	-	-	-	-	14	4	25	8	60	19	322
Convex	265	57	53	11	-	-	2	-	-	-	28	6	34	7	85	18	467
Concave-Convex	106	56	21	11	-	-	-	-	-	-	16	8	13	7	33	17	189
Projection	26	65	5	13	-	-	-	-	-	-	1	3	-	-	8	20	40
Placement of Modification:																	
Bilateral	134	56	43	18	-	-	-	-	-	-	7	3	27	11	32	13	243
Lateral	776	60	135	10	1	-	4	-	1	-	80	6	69	5	225	17	1291
Distal	399	62	63	10	-	-	3	1	2	-	24	4	44	7	104	16	639
Proximal	2	67	1	33	-	-	-	-	-	-	-	-	-	-	-	-	3
Undetermined	162	72	11	8	-	-	-	-	-	-	3	2	7	5	18	13	141
Location of Modification:																	
Dorsal	999	61	185	11	1	-	6	-	2	-	86	5	110	7	259	16	1648
Ventral	312	63	47	9	-	-	-	-	1	-	20	4	28	6	89	18	497
Multiple	182	59	21	12	-	-	1	1	-	-	8	5	9	5	31	18	172
Heat Spalled:	104	62	32	19	-	-	-	-	-	-	8	5	1	1	22	13	167

Table 6. Horizontal distribution of modified flakes by lithic type.

Excavation Units	Lithic Type								Total
	A	B	C	D	E	F	H	J	
N16-W0	101	15	-	-	-	18	11	42	187
N28-W0	125	20	-	-	-	17	13	24	199
N28-E2	139	23	-	-	-	14	8	35	219
N30-W8	135	15	-	-	-	14	22	39	225
N24-E10	99	21	1	-	-	3	8	26	158
N24-E12	92	11	-	-	-	4	4	16	127
N26-E10	80	18	-	-	-	4	10	31	143
N26-E12	60	8	-	-	-	6	3	19	96
N28-E12	140	27	-	1	1	5	26	32	232
N28-E14	126	35	-	1	2	5	8	40	217
N41-E2	107	31	-	2	-	9	11	22	182
N48-W14	91	13	-	-	-	9	11	26	150
N50-E29	88	9	-	2	-	3	7	16	125
S1-E21	5	3	-	-	-	-	-	5	13
N6-W11	20	4	-	1	-	3	3	4	35
N27-E44	1	-	-	-	-	-	1	2	4
Surface	4	-	-	-	-	-	1	-	5
Total	1413	253	1	7	3	114	147	379	2317

Table 7. Vertical distribution of modified flakes by lithic type.

Arbitrary Levels (10cm)	Lithic Type								Total
	A	B	C	D	E	F	H	J	
Surface	4	-	-	-	-	-	1	-	5
1	206	23	-	1	-	15	13	38	296
2	205	38	1	2	-	22	24	75	367
3	117	28	-	-	1	8	13	38	205
4	130	25	-	-	-	11	5	33	204
5	91	22	-	-	-	11	6	39	169
6	95	15	-	-	-	12	8	33	163
7	89	15	-	-	-	11	6	24	145
8	100	19	-	-	-	2	18	18	157
9	72	17	-	1	2	5	10	22	129
10	62	9	-	-	-	3	15	7	96
11	70	13	-	2	-	9	6	16	116
12	47	13	-	-	-	-	4	6	70
13	39	6	-	-	-	2	4	2	53
14	27	1	-	-	-	-	5	9	42
15	18	5	-	-	-	-	5	8	36
16	19	-	-	1	-	-	-	2	22
17	4	2	-	-	-	-	1	5	12
18	2	1	-	-	-	-	-	-	3
Code 4*	16	1	-	-	-	3	3	4	27
Total	1413	253	1	7	3	114	147	379	2317

\* Includes flakes associated with features.

## EDGE ALTERED FLAKES

Category 45 (01-13-01B) N=2236: 1514 Complete, 722 Fragmentary

These flakes have either been retouched or utilized as indicated by numerous small, irregular flake scars. Edge alteration is mostly along lateral and distal edges.

## DENTICULATES

Category 46 (01-13-01C) N=33: 25 Complete, 8 Fragmentary

These specimens have intentionally produced edges which are serrated by bifacial (23) or unifacial retouch (10). Eight are retouched along the distal edge, three are bilaterally retouched, and 22 have lateral retouch. Eight lack striking platforms, and 19 have cortex on the dorsal surface.

## CORES

Category 47 (01-14-01A) N=5: 5 Complete

These specimens include split cobble sections (2) and cobbles (3) which have had large flakes systematically removed unidirectionally (2) and multidirectionally (3). Cross sections are thick, plano-convex (2) and irregular (3). Edges are irregular, and all specimens have little or no evidence of shaping. Cortex is present on four specimens and covers from 10-60% of the dorsal surface. Edge retouch/crushing is evident on the striking platforms of three specimens, and reflects either platform preparation or wear. Thermal alteration is absent.

## SPLIT/TESTED COBBLES

### SPLIT COBBLES

Category 48 (01-15-01A) N=20: 20 Complete

This category includes split cobble sections with very little additional flake removal (40%) or one to several large flakes removed from either the dorsal (20%) or ventral surfaces (40%). Well rounded cortex (30%) is evident on 17 specimens and may indicate procurement of water or stream rolled cobbles. Two artifacts are thermally altered.

One specimen has continuous deep conchoidal retouch along a convex edge. Lateral edges are sinuous and cross sections are thick and irregular. These specimens are believed to represent procurement and initial modification activities.

#### TESTED COBBLES

Category 49 (01-15-02A) N=45: 45 Complete

These specimens also represent procurement and initial modification. They consist of split (18%), ovate (22%), tabular (17%), and blocky (42%) shaped cobbles/pebbles. They have been minimally flaked, and 87% of the sample retains more than 50% cortex. Flake scars are large and massive. Hinge and step fractures are common, and discontinuous deep conchoidal retouch is apparent on 18%. Light to extensive battering/crushing is evident on the end and lateral margins of seven specimens and suggest use as hammerstones. Cross sections are thick and irregular. Edges, for the most part, are sinuous and there is little evidence of shaping.

#### DEBITAGE

Category 50 (01-16-01A) N=267,920

This category consists of flakes and pieces of blocky debris not exhibiting evidence of use or wear. Table 8 illustrates horizontal and vertical distributions. The large number precluded lithic type identification of each specimen. Therefore, Table 9 presents vertical distributions of lithic types from N28-E2. This square included the 1 m control square which was waterscreened. Only debitage larger than 0.64 cm ( $\frac{1}{4}$ -inch) was analyzed, and the 5 cm levels have been combined into 10 cm units. Lithic type data is presented in Table 10 for a 10% random sample of the debitage.

The majority of the debitage is composed of tertiary flakes. Ten percent (2348) of the waterscreened material had cortex and 4% (891) of the random sample had cortex.

#### FIRE CLAY

#### CERAMICS

Ceramic categories are divided on the basis of surface treatment (plain and decorated) and temper. Decorated categories consist of

Table 8. Horizontal and vertical distribution of lithic debitage.

Excavation Units	Arbitrary 10 cm Levels																		Code				Total
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	5	4			
M16-W0	4702	4169	3237	1256	1448	1358	1625	1234	501	278	44	196	-	-	-	-	-	-	-	-	20,048		
M28-W0	2507	2904	2478	3172	2763	2860	1811	1642	1994	1509	1509	643	236	264	370	-	-	-	-	441	27,103		
M28-E2	3690	4294	2491	3924	3504	2234	1724	1694	1211	1070	1208	1008	767	545	580	388	242	-	-	611	31,185		
M30-W8	4574	2591	1734	1493	2119	1134	892	825	367	284	197	97	74	62	-	-	-	-	-	-	16,443		
M24-E10	1931	1737	2593	2848	942	1908	1432	2330	1376	1526	903	920	509	250	146	-	-	-	-	-	21,351		
M24-E12	1953	2342	2306	3156	2999	1432	1305	706	1203	1481	1195	917	566	329	137	-	-	-	-	-	22,027		
M26-E10	1847	5094	2382	1670	1026	1182	2036	1912	1524	946	514	326	951	764	446	-	-	-	-	-	22,620		
M26-E12	2495	3226	1472	1268	1284	1794	865	1323	1142	1257	678	766	-	-	-	-	-	-	-	-	17,570		
M28-E12	2291	1615	1954	1627	1781	1221	1289	1049	995	608	611	568	413	275	196	108	63	41	-	327	17,032		
M28-E14	1009	2231	1078	1380	1922	1737	2140	1524	1354	1184	962	582	312	209	138	106	-	-	-	-	17,868		
M41-E2	778	1374	2582	2034	1720	1770	1335	1493	1149	1018	912	831	640	324	307	269	207	144	-	275	19,162		
M48-W14	1479	3472	2581	2621	1808	2425	1428	365	84	-	-	-	-	-	-	-	-	-	-	-	16,263		
M50-E29	4086	3679	2571	2283	1194	874	445	257	205	-	-	-	-	-	-	-	-	-	-	-	15,594		
S1-E21	205	242	140	221	106	52	-	-	-	-	-	-	-	-	-	-	-	-	-	-	966		
M6-W11	502	663	213	116	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1,557		
M27-E44	238	169	260	216	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	883		
M65-W14	35	83	41	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	159		
Backhoe Trenches	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	49	49		
Surface	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	40	40		

Table 9. Lithic types of debitage larger than  $\frac{1}{4}$ -inch from N28-E2.<sup>1</sup>

Arbitrary Levels (10cm)	Lithic Type									Total
	A	B	C	D	E	F	H	I	J	
1	2177	121	-	-	2	30	251	-	142	2723
2	3002	67	1	-	-	19	316	1	112	3518
3	1564	46	1	-	-	7	101	-	59	1778
4	2851	57	1	-	-	17	213	-	109	3248
5	2349	20	1	-	-	19	212	1	91	2693
6	1496	33	-	-	1	17	175	-	71	1793
7	1130	13	-	-	-	12	188	-	25	1368
8	857	10	-	-	-	13	144	-	32	1056
9	672	14	-	-	-	14	165	-	43	908
10	611	10	-	-	-	21	115	-	37	794
11	641	10	-	-	-	23	82	-	51	807
12	610	17	-	-	-	6	84	-	57	774
13	391	17	-	-	-	5	55	-	38	506
14	328	17	-	-	-	9	40	-	32	426
15	354	9	-	-	-	10	40	-	26	439
16	214	9	-	-	-	1	25	-	21	270
17	142	1	-	-	-	6	12	-	11	172
Code 4	500	17	-	-	-	13	55	-	26	611
Total	19,889	488	4	-	3	242	2273	2	983	23,884

<sup>1</sup>Waterscreen materials (5 cm levels) have been combined into 10 cm levels.

Table 10. Random sample of debitage lithic types.

Excavation Unit & Arbitrary Level (10 cm)	Lithic Type										Total
	A	B	C	D	E	F	G	H	I	J	
N28-E12											
2	1434	18	-	19	-	5	2	112	-	25	1615
10	479	17	-	-	-	3	3	82	-	24	608
13	321	10	-	20	-	3	-	48	-	11	413
17	48	2	-	1	-	-	-	1	-	11	63
N28-E14											
1	832	33	-	-	-	2	-	100	1	41	1009
7	1742	7	-	1	3	14	-	319	-	54	2140
14	183	-	-	1	-	1	-	20	-	4	209
N26-E10											
4	1481	35	1	-	4	9	-	110	-	30	1670
5	886	20	2	-	15	5	-	87	-	11	1026
10	789	14	-	-	9	2	-	116	-	16	946
N26-E12											
6	1458	33	-	-	3	3	-	269	-	28	1794
N24-E10											
7	1247	17	1	-	2	-	-	151	-	14	1432
N16-W0											
8	808	14	-	-	2	18	-	340	-	52	1234
11	37	-	-	-	1	1	-	3	-	2	44
N30-W8											
2	2016	158	2	10	4	20	3	281	1	96	2591
7	613	17	-	-	-	2	-	257	-	3	892
8	521	5	-	1	4	5	-	272	-	17	825
N48-W14											
1	1239	31	-	3	-	1	-	170	-	35	1479
N50-E29											
6	698	11	-	-	3	5	-	134	-	23	874
S1-E21											
3	102	13	-	-	-	-	-	15	1	9	140
Total	16,934	455	6	56	50	99	8	2887	3	506	21,004

slipped, incised, and pinched wares. Each category is further divided into varieties (which may be considered types) which are listed alphabetically.

#### Category 51 PLAIN GROG, GRIT, AND BONE TEMPERED CERAMICS

Variety A (02-01-01A) N=150: 4 Rim, 144, Body, and 2 Basal sherds  
(Figure 21 a-e)

Definition: An undecorated plain grog and grit tempered ware. Exterior surfaces are almost evenly divided between burnished and unburnished, but interiors are primarily unburnished. Vessel walls are thick with a very coarse, porous paste.

Method of Manufacture: Coiling with many sherds broken along coil welds.

Paste:

Temper: Angular particles of grog and grit.

Texture: The paste is either very coarse (93%) or coarse (7%) and porous (88%) to slightly porous (12%).

Surface Treatment: Exterior and interior surfaces are uneven and predominantly smoothed. Wiping marks are evident on 8% of the exteriors and 5% of the interiors. Fire clouds occur on 19% of the exterior and 12% of the interior surfaces. Visible temper is evident on 14% and 19% of exterior and interior surfaces respectively. Exterior surfaces are either burnished (51%) or unburnished (49%) and interiors are mainly unburnished (76%). Eroded surfaces are present on 7% of the exteriors and 4% of the interiors.

Color: Exterior colors are predominantly brown (74%) followed by variations of gray (15%) and yellow and red (11%). Dark gray (47%) is the most common interior color, but dark to light browns are also common (42%). The remaining colors are pink, light red, and black. Most of the cores are solid (71) and are either dark gray (54%), black (24%), or brown (15%). The remainder are variations of reddish yellow. Zoned cores are evident in 44 specimens with the majority of the interiors being dark gray and either reddish brown or light brown exteriors. The remaining sherds are split.

Form and Thickness: Rim (N=4): Range = 8.3-11.3 mm, mean = 9.8 mm; Body (N=111): Range = 6.0-15.0 mm, mean = 9.8 mm; and Base (N=2): Range = 6.5-14.9 mm, mean = 10.7 mm.

Rims:

Everted: Direct rim; lip form flat, A2 (N=2).

Thinned rim; lip form flat, A2 (N=1).

Thinned rim, lip form rounded, B2 (N=1).

Exterior and interior surfaces are evenly divided between burnished and unburnished. All specimens are smoothed and fire clouds are present on two exterior and interior surfaces. One specimen has a zoned core.

Bases:

One base is rounded and the other is stilted. The latter specimen is basket impressed, has a fire cloud on the interior surface which is smoothed, and has a rough interior. The other specimen is smoothed, burnished, and has wiping marks on the exterior.

Comments: This variety is similar to *Williams Plain* as defined by Newkumet (1940) and refined by Brown (1971: 42) and Irvine (1980: 15-20). It is comparable to similar wares described at the Scott site (Bell 1953: 328; Galm and Flynn 1978: 197-199), the Sam site (Proctor 1957: 72), the Curtis Lake site (Galm 1978b: 121), and the Wann site (Sharrock 1960: 38; Galm and Flynn 1978: 258-262). This type has been defined at eight sites in the Clayton Lake area (Vehik and Galm 1979; Vehik 1982).

Variety B (02-01-01A) N=57: 2 Rims, 55 Body sherds (Figure 21 f-g)

Definition: The same as the preceding variety except for the addition of bone as a tempering agent. Most of the exterior surfaces are burnished.

Method of Manufacture: Coiling.

Paste:

Temper: Almost exclusively grog, grit, and bone particles. One sherd has shale inclusions.

Texture: Very coarse, porous paste.

Surface Treatment: Exteriors are uneven and smoothed with 10% exhibiting wiping marks, 4% eroded surfaces, 18% fire clouded, 42% have visible temper on the surface, and 68% are burnished. Sixty-one percent of the interiors are unburnished, 70% have visible temper on the surface, 9% are eroded, and 2% have wiping marks and are fire clouded. They are also relatively uneven and smoothed.

Color: The main exterior color is brown (40%) but gray is also common (28%). Other colors are reddish brown, reddish yellow, light red, and black. Interiors are dark gray (56%), brown (28%), and black and light red. The majority of the cores are solid (34) and are either dark gray (82%) or black (18%). Zoned cores are evident in 12 specimens. Exteriors are mostly light brown and interiors are very dark gray to black, but some lighter colors (reddish brown and yellow, light brown, light red, and yellowish red) also occur.

Form and Thickness: Rims (N=2): Range = 9.8-11.3 mm, mean = 10.6 mm; Body (N=51): Range = 7.0-14.9 mm, mean = 10.2 mm.

Rims:

Everted: Thinned rim, lip form rounded, B2 (N=2)

The interior and exterior of one rim is burnished and smooth. Visible temper is evident on the exterior of this specimen. The exterior and interior of the other rim are unburnished, eroded, rough, and exhibit visible temper. The exterior also has wiping marks.

Comments: This variety is similar to the preceding *Williams Plain* variety. Irvine (1980: 15-20) notes that bone inclusions occur in 9.7% of the *Williams Plain* sample at the Williams I site. Brown (1971: 42) also discusses the occurrence of bone tempering in *Williams Plain* pottery. Galm and Flynn (1978: 201-202, 264-266) describe it as Lot D from the Scott and Wann sites.

Variety C (02-01-01B) N=72: 9 Rims, 61 Body, and 2 Base sherds  
(Figures 21 h; 22 a-b)

Definition: The sample is made up of mostly grit, grog, and bone tempered ceramics. It is characterized by a dark gritty paste and dark burnished surfaces. It tends to be thinner than the preceding varieties.

Method of Manufacture: Coiling.

Paste:

Temper: Predominantly small particles of grit and grog (67%). Fifteen sherds have bone inclusions, six have shale inclusions, two have quartz inclusions, and one is only grit tempered.

Texture: The paste is relatively compact, porous (85%) to slightly porous (15%), and has a medium coarse to coarse texture.

Surface Treatment: Exterior surfaces tend to be burnished (59%) with wiping marks (3%), fire clouds (6%), and visible temper on the surface (30%). They are uneven and smoothed. Interiors are uneven and smooth and 54% are burnished. They exhibit wiping marks (6%), fire clouds (8%), and visible temper on the surface (33%).

Color: Exterior colors are commonly brown (54%) or dark gray (35%). Other variations are red, pink, and reddish yellow. Interiors are either dark gray (77%) or brown (23%). Eight cores are zoned and exteriors are commonly light brown, gray, or red. Interiors are very dark gray. The rest of the cores are solid and are very dark gray (95%) or reddish brown and black.

Form and Thickness: Rims (N=9): Range = 4.6-8.8 mm, mean = 6.7 mm; Body (N=56): Range = 5.1-9.7 mm, mean = 8.0 mm; Base (N=2): Range = 7.4-8.7 mm, mean = 7.9 mm.

Rims:

- Everted: Direct rim; lip form flat, A2 (N=2).  
 Thinned rim; lip form flat, A2 (N=2).  
 Thinned rim; lip form rounded, A2 (N=3).  
 Expanding rim; lip form flat, A2 (N=1).  
Inverted: Direct rim; lip form flat, B2 (N=1).

Eight rims are burnished and smoothed. Visible temper is present on two exterior and two interior surfaces. Wiping marks and fire clouds are present on one specimen.

Bases: The interior and exterior of both specimens are rounded. One base is burnished and the other is unburnished, but both are smooth and visible grog particles occur on the surface.

Comments: With the exception of bone temper in 21% of the sample, these sherds resemble the *LeFlore Plain* type (Brown 1971: 58). Similar sherds have been recovered from the Curtis Lake site (Galm 1978b: 122), the Scott and Wann sites (Galm and Flynn 1978: 199-200, 262-263; Sharrock 1960: 38), the Sam site (Proctor 1957: 76), and the Williams I site (Irvine 1980: 20-22). Similar sherds are also described from 34Pu-74, 34Pu-79, 34Pu-100, 34Pu-105, and 34Pu-111 in the Clayton Lake area (Vehik and Galm 1979; Vehik 1982).

## Category 52 DECORATED GROG, GRIT, AND BONE TEMPERED CERAMICS

Variety D (02-01-02A) N=3: 3 Body sherds (Figure 22 c-e)

Definition: A red, slipped ware tempered with grit, grog, and kaolin. Exteriors are burnished and smoothed.

Method of Manufacture: Coiling.

Paste:

- Temper: Grit, grog, and kaolin.  
Texture: Medium coarse and slightly porous.

Surface Treatment: Exteriors are smooth, burnished, and have visible particles of temper on the surface. They may be slipped. The only difference in the interiors is that two are unburnished.

Color: Exteriors are reddish brown to red, interiors are gray, and cores are solid and dark gray.

Form and Thickness: Body (N=3): Range = 5.4-7.4 mm, Mean = 6.2 mm.

Comments: This variety is similar to the *Sanders Plain* type (Brown 1971: 164-169). It has been defined from the Scott site (Galm and Flynn 1978: 205-206), the Curtis Lake site (Galm 1978b: 123), the

**Figure 21. Selected ceramic categories and varieties from the Bug Hill site (34Pu-116). Cross sections are drawn with vessel exteriors to the right.**

**a-e: Category 51, Variety A**

**f-g: Category 51, Variety B**

**h: Category 51, Variety C**



A



B



C

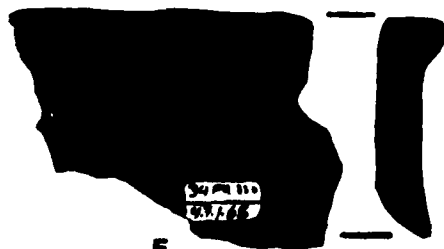


D



E

5 CM



F



G



H

Williams I site (Irvine 1980: 31), and at several other tested sites in the Wister Valley (Galm 1978a: 176-177). It has also been described from several sites in the Clayton Lake area (Vehik and Galm 1979; Vehik 1982).

Variety E (02-01-02B) N=5: 5 Body sherds (Figure 22 e)

Definition: This sample is similar to Variety A except for the presence of incised or engraved lines.

Method of Manufacture: Coiling.

Paste:

Temper: Grit and grog, but two sherds have additional bone inclusions.

Texture: Very coarse and slightly porous to porous.

Surface Treatment: Exteriors are uneven, smoothed, unburnished (60%), and have visible temper on the surface (80%). Four specimens have incised lines and one has engraved lines. Interiors are uneven, smoothed, and unburnished (60%). Fire clouds occur on 20% and visible temper is evident on 80%.

Decoration: One specimen has four unevenly spaced parallel engraved lines. This may be a rim decoration, but the sherd does not have a lip. The remainder of the decorations consist of incised lines. One is a single incised line (1.0 mm wide) with visible striations in the incision. Another sherd has two parallel lines (9.0 mm apart) which are diagonally intersected by five irregularly spaced incised lines. One sherd has six parallel incised lines intersected by four diagonal incised lines. The last decorative motif consists of diagonally intersecting incised lines less than 1.0 mm wide.

Color: Exteriors are either brown (60%) or gray (40%). Interiors are gray (60%) and brown (40%). Cores are solid and very dark gray.

Form and Thickness: Body (N=5): Range = 6.9-10.2 mm, Mean = 8.4 mm.

Comments: This variety is similar to *Williams Incised* described from the Spiro and Williams I sites (Brown 1971: 72; Newkumet 1940: 4; Irvine 1980: 33). It is also similar to *Williams Decorated* from the Sam site (Proctor 1957: 72) and to Lot I from the Scott and Wann sites (Galm and Flynn 1978: 206-207, 269-270).

Variety F N=10: 2 Rims, 8 Body sherds (Figure 22 f-i)

Definition: With the exception of the incised lines, this sample is similar to Variety C described above.

Method of Manufacture: Coiling.

Paste:

Temper: Predominantly grit and grog, but one sherd has bone and shale inclusions. Several sherds have a sparkly appearance, probably due to crushed quartzite.

Texture: The paste is medium coarse, compact (60%), and slightly porous (40%).

Surface Treatment: Exteriors are uneven and smoothed. The majority are unburnished (60%) and are incised. Fire clouds (20%) and visible temper on the surface (40%) are also apparent. Interiors are uneven, unburnished (60%), and exhibit fire clouds (40%), wiping marks (10%), and visible temper on the surface (20%).

Decoration: Decorative motifs consist of incised lines. Four sherds have single incised lines which are less than 0.5 mm deep, and one line is 1.4 mm wide. One sherd has parallel, slightly curved lines which are 9.0 mm apart, less than 1.0 mm wide, and 0.5 mm deep. Two sherds have three parallel lines. On one sherd, the lines are less than 1.0 mm wide and 9.0 mm apart, and on another sherd the lines are 7.5-12.0 mm apart and less than 0.5 mm deep and 1.0 mm wide. One sherd has four irregularly spaced parallel lines which are less than 1.0 mm wide and more than 0.5 mm deep. The two rim sherds have incised lines parallel to the lip. One has two lines which are 2.0 mm wide and less than 1.0 mm deep. The other rim has three lines which are 4.0 mm apart and less than 1.0 mm deep and wide.

Color: Exteriors are gray (60%), brown (30%), or pink (10%). Interiors are gray (50%), brown (30%), and pink (20%). Six cores are solid and gray to black (83%) and pink (17%). Four sherds have zoned cores with reddish brown and dark gray exteriors and dark gray interiors.

Form and Thickness: Rims (N=2): Range = 5.2-8.2 mm, Mean = 6.7 mm; Body (N=8): Range = 4.9 mm, Mean = 5.8 mm.

Rims:

Standing: Direct rim; lip form flat, A1 (N=2).

Exterior surfaces are burnished and incised. One has an eroded and uneven surface and the other is smooth, but has temper visible on its surface. One interior is smooth and burnished. The other sherd has a smooth, unburnished interior with wiping marks.

Comments: This variety is similar to Lot L from the Scott site and Lot J from the Wann site (Galm and Flynn 1978: 210-211, 273).

Variety G N=1: 1 Body sherd (Figure 22 j)

Definition: A grog and grit tempered sherd with incised lines and small punctates on the exterior.

Method of Manufacture: Probably coiling.

Paste:

Temper: Grog and grit.

Texture: Coarse and slightly porous.

Surface Treatment: The exterior and interior are smooth and have visible temper particles. The exterior has punctates and incised lines.

Decoration: Two parallel incised lines 9.0 mm apart. A single diagonal line cross-cuts the parallel lines. The area between the parallel lines is filled with small circular punctates.

Color: The exterior is dark reddish gray and the interior and core are dark gray.

Form and Thickness: Body (N=1): 7.6 mm.

Comments: This specimen cannot be placed into a defined type. However, the incisions and punctations are similar to a specimen defined as *Crockett Curvilinear* from the Sam site (Proctor 1957: 77).

#### Category 53 PLAIN SHELL TEMPERED CERAMICS

Variety H (02-01-03A) N=36: 1 Rim, 35 Body sherds (Figure 22 k-1)

Definition: This variety is shell and grit tempered. Surfaces are smooth and almost evenly divided between burnished and unburnished, and the majority are leached.

Method of Manufacture: Coiling.

Paste:

Temper: Predominantly shell with grit inclusions.

Texture: Medium coarse, porous, and laminated.

Surface Treatment: Exteriors are burnished (52%), uneven, and smoothed. All are leached, 7% are eroded, and the paste is laminated (70%). Interior surfaces are smoothed, burnished (58%), leached (100%), eroded (8%), exhibit wiping marks (8%), and have laminated paste (92%).

Color: Variations of brown (71%) and reddish yellow are predominant on exterior surfaces. Interiors are mostly gray (77%), brown, and black. Fourteen cores are solid with one being black and the remainder dark gray. Zoning is present on six cores and reddish brown exteriors and very dark gray interiors occur on 84% of the sample. One sherd has a reddish yellow exterior and one has a reddish yellow interior.

Form and Thickness: Rim (N=1): 9.2 mm; Body (N=21): Range = 4.3-11.7 mm, Mean = 7.6 mm.

Rims:

Everted: Thinned rim, lip form rounded, B2 (N=1).

The exterior and interior are unburnished, laminated, leached, and smoothed.

Comments: These ceramics are most similar to *Woodward Plain* as described by Hall (1951) and refined by Freeman and Buck (1960). Galm and Flynn (1978: 203-204, 269) identify similar pottery from the Scott and Wann sites, Brown (1971: 141-146) from the Spiro site, and Irvine (1980: 28-29) from the Williams I site. Plain shell tempered pottery has also been described from 34Lt-32, 34Pu-73, 34Pu-74, 34Pu-100, and 34Pu-105 in the Clayton Lake area (Vehik and Galm 1979; Vehik 1982).

Variety I N=5: 5 Body sherds

Definition: These sherds are similar to Variety A except for the addition of shell. The surfaces, for the most part, are unburnished, uneven, exhibit leaching, and particles of temper are visible.

Method of Manufacture: Probably coiling.

Paste:

Temper: All have grog, grit, bone, and shell tempering.

Texture: Coarse and porous.

Surface Treatment: Exteriors are unburnished (80%), uneven, eroded (20%), leached (80%), and 60% have visible temper. Interiors are rough and unburnished (80%), but tend to have a laminated paste exhibiting wiping marks (20%) and are leached (40%).

Color: Exterior colors vary between each sherd but gray and variations of red are the most common. Interior surfaces are all gray with very dark gray being the most common. Cores are solid and dark gray.

Form and Thickness: Body (N=5): Range = 6.7-10.7 mm, Mean = 8.5 mm.

Comments: This variety is similar to the grit, bone, and shell tempered sherds described from the Williams I site (Irvine 1980: 27-28).

# Category 54 DECORATED SHELL TEMPERED CERAMICS

Variety J N=1: 1 Body sherd

Definition: This specimen is similar to Variety H except for two parallel lines incised in the exterior surface.

Method of Manufacture: Probably coiling.

Paste:

Temper: Shell and grit.

Texture: Well mixed, medium to coarse compact texture.

Surface Treatment: The exterior is uneven, unburnished, leached and incised. It also has visible particles of temper. The interior is smooth, burnished, leached, laminated, and has wiping marks.

Decoration: Two parallel incised lines 3.2 mm apart. The lines are 1.0 mm wide and less than 1.0 mm deep.

Color: The exterior is very pale brown and the interior and core are very dark gray.

Form and Thickness: Body (N=1): 5.9 mm.

Comments: Galm and Flynn (1978: 212-213) describe a decorated clay-grit and shell tempered ware (Lot N) from the Scott site.

Variety K N=5: 1 Rim, 4 Body sherds (Figure 22 m-n)

Definition: This is predominantly shell tempered with finger pinched punctates. Extensive leaching is apparent on the exterior and interior surfaces.

Method of Manufacture: Probably coiling.

Paste:

Temper: Shell and grit with small amounts of clay.

Texture: Medium coarse and slightly porous.

Surface Treatment: Exteriors are burnished (60%), leached (80%), eroded (20%), and have visible temper (20%). They are smoothed, punctated, and the paste is laminated. All interior surfaces are burnished, smoothed, have laminated paste (80%), leached (80%), and have visible temper particles (40%).

Decoration: Consists of finger pinched or fingernail punctates oriented diagonally. One sherd has a single punctate and the rest have at least three punctates.

Color: Exteriors are either light red (60%) or gray (40%). Reddish colors (60%) are common on interiors and cores are solid and dark gray.

Form and Thickness: Rim (N=1): 8.5 mm; Body (N=4): Range = 5.6-6.5 mm, Mean = 6.1 mm.

Rims:

Everted: Direct rim, lip form rounded, A2 (N=1).

The exterior is burnished, eroded, laminated, and leached with small amounts of shell on the surface. It is also decorated with rows of finger pinched punctates aligned diagonally in columns up to the vessel lip. The interior is burnished, smoothed, and has shell and other temper on its surface.

Comments: This variety cannot be assigned to any recognizable type. The finger pinched decorations are similar to decorative elements on *Beaver Pinched* pottery, but the temper is different (Brown 1971: 102-103; Wyckoff 1968a: 102-103). Brown (1971: 102) and Wyckoff (1965: 90-93; 1967: 124-125; 1968b: 140) have defined a number of punctated sherds which are shell and grit tempered and may be similar to the sample described above.

#### Category 55 PLAIN SHALE TEMPERED CERAMICS

Variety L (02-01-05A) N=19: 19 Body sherds (Figure 22 o-p)

Definition: These are primarily tempered with shale and grit. Interior and exterior surfaces are mostly unburnished and visible tempering is apparent.

Method of Manufacture: Probably coiling.

Paste:

Temper: All are shale and grit tempered, but 89% have quartz and 5% have grog inclusions.

Texture: Medium to coarse, porous texture.

Surface Treatment: Exteriors are mostly burnished (84%), even, and have visible temper. Interiors have the same attributes except that 74% are burnished, 5% have wiping marks, and the paste is laminated.

Color: Exteriors are mostly gray (90%) or light brown (10%). Interiors are also gray (80%), light brown (15%), or black (5%). Ten cores are solid, very dark gray or black (90%) and pale brown (10%). Nine cores are zoned. Exteriors range from gray to brown and interiors from very dark gray to light brown.

Form and Thickness: Body (N=19): Range = 5.0-6.6 mm, Mean = 5.7 mm.

Comments: This variety may correspond to similar ceramics from the Beaver site (Wyckoff 1968a: 120-121), Spiro (Brown 1971: 69), Sam (Proctor 1957: 76), and Williams I (Irvine 1980: 22-24). Similar pottery has been recovered from 34Pu-105 and 34Pu-111 in the Clayton Lake area (Vehik 1982).

#### Category 56 DECORATED GRIT, GROG, AND SHALE TEMPERED CERAMICS

Variety M N=5: 5 Body sherds (Figure 22 q)

Definition: This is a medium to coarse textured pottery tempered with grit and grog. It is characterized by either pinched or fingernail impressed punctates on the exterior.

Method of Manufacture: Probably coiling.

Paste:

Temper: Grit and grog particles.

Texture: Medium to coarse and slightly porous.

Surface Treatment: Exteriors are smoothed, unburnished (60%), and have visible temper on the surface as well as punctates. Interiors are smoothed, unburnished (60%), and 20% have wiping marks.

Decoration: Three sherds have finger pinched punctates, one is believe to have fingernail punctates, and one may be punctated by a circular reed.

Color: Variations of brown on the exterior, very dark gray interiors, and two solid cores are very dark gray. Three cores are zoned with light brown exteriors and dark gray interiors.

Form and Thickness: Body (N=5): Range = 7.0-8.2 mm, Mean = 7.7 mm.

Comments: This variety is similar to the *Beaver Pinched Punctate* pottery from the Williams I site (Irvine 1980: 46-47). The type variety was first described from the Beaver site (Wyckoff 1968a: 102-103). It is also a type associated with the Harlan phase (Brown 1971: 220). In the Clayton Lake area, similar pottery occurs at 34Pu-105 (Bobalik 1982).

Variety N N=1: 1 Rim sherd (Figure 22 r)

Definition: This sherd has a well mixed texture. The interior and exterior are burnished, but the exterior is also decorated with a single parallel incised line.

Method of Manufacture: Coiling.

Paste:Temper: Grit, grog, and shale.Texture: Medium coarse, well mixed, and slightly porous.Surface Treatment: The exterior is burnished, smoothed, and incised. The interior is smoothed and burnished and has a fire cloud and grog particles on its surface.Decoration: A single incised line, 11.6 mm below the lip, is parallel to the rim. The line is 1.2 mm wide and less than 0.5 mm deep.Color: The exterior is reddish brown, the interior is dark gray, and the core is solid and very dark gray.Form and Thickness: Rim (N=1): 5.7 mm.Everted: Direct rim; lip form flat, A2 (N=1).Comments: This sherd cannot be assigned to any recognizable type, but the single incised line paralleling the rim is reminiscent of decorative elements on *Coles Creek* pottery (Brown 1971: 73-75).

## CERAMIC PIPES

## Category 57 (02-02-02A) N=1 (Figure 22 s)

This is a 36.7 mm long stem fragment of a ceramic pipe. The paste is well mixed, compact, and tempered with grit and grog. Crushed quartz crystals in the temper provide a sparkly appearance. The exterior surface is unburnished, fire clouded, smooth, visible grog is apparent, and multicolored (light brown, reddish yellow, and very dark gray). The core is solid and very dark gray. The outline is oval and the fragment tapers toward the stem with the widest diameter being 17.5 mm and the narrowest 11.7 mm. A small hole (diameter 4.6 mm) is offset from the center.

Comments: The overall characteristics and dimensions of this specimen place it well within the described range of *Poole* pipes (Hoffman 1967: 5-7).

## CERAMIC BEADS

## Category 58 N=1 (Figure 22 t)

This is a small circular bead with one end flat and the other concave. The past is well mixed, compact, and primarily grit tempered

Figure 22. Selected ceramic categories and varieties from the Bug Hill site (34Pu-116). Cross sections are drawn with vessel exteriors to the right.

a-b: Category 51, Variety C

c-d: Category 52, Variety D

e: Category 52, Variety E

f-i: Category 52, Variety F

j: Category 52, Variety G

k-l: Category 53, Variety H

m-n: Category 54, Variety K

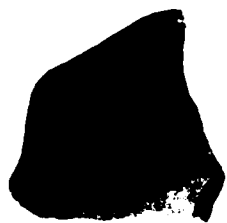
o-p: Category 55, Variety L

q: Category 56, Variety M

r: Category 56, Variety N

s: Category 57

t: Category 58



A



B



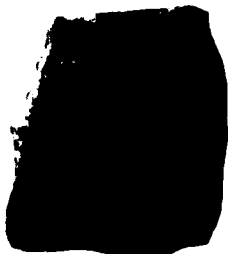
C



D



E



F



G



H



I



J



K



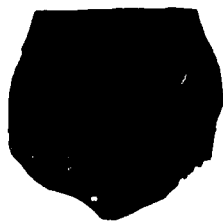
L



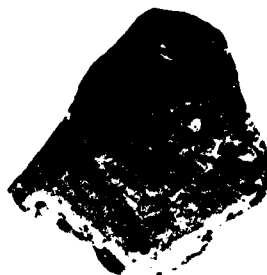
M



N



O



P



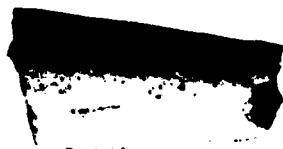
Q



5 CM



R



S



T

with a small amount of grog inclusions. The surface is unburnished, slightly eroded, smooth, and has a brownish color. A round hole, 3.0 mm in diameter, is offset toward one edge. This specimen is 5.2 mm long and has a diameter of 7.5 mm.

#### *BAKED CLAY*

##### Category 59 (02-03-01A)

This category consists of amorphous fragments of fired clay. Colors range from gray to yellowish red. None are grass or stick impressed. Table 11 provides the horizontal and vertical distribution of baked clay.

##### Category 60 (02-03-01B)

These also are amorphous fragments of gray to yellowish red fired clay. However, they are distinguished from the preceding category by being either grass or stick impressed. Several other pieces were cylindrical in shape, and are believed to be insect nest remnants.

#### MUD DAUBER NESTS

##### Category 61 (02-03-02A)

Mud dauber nests were found at Level 13 (120-130 cm) in N28-E14, at Level 6 (50-60 cm) in N28-W0, and at Level 3 (20-30 cm) in N50-E29. All three were empty and fragmentary.

#### GROUND STONE

#### *MANOS*

This class of artifacts is divided into three categories: Unifacially ground specimens, bifacially modified specimens, and those exhibiting pitting in addition to grinding. Measurements for the categories and other ground stone categories are in the Appendix.

#### UNIFACIAL MANOS

Category 62 (03-01-01A) N=22: 2 Complete, 20 Fragmentary (Figure 23 a)

Table 11. Horizontal and vertical distribution of baked clay by weight (in grams).

Excavation Units	Arbitrary Levels (10 cm)																	Total
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	
M16-W0	229.6	267.3	404.0	48.4	72.4	87.3	94.3	51.4	23.8	13.2	7.6	5.0	-	-	-	-	-	1,304.3
M28-W0	103.5	227.5	178.0	189.4	276.8	274.2	196.2	245.4	185.8	174.0	91.1	7.0	9.6	10.0	12.5	-	-	2,181.0
M28-E2	111.8	68.2	88.9	88.1	112.7	18.6	33.3	6.9	12.8	5.6	14.5	52.4	18.5	23.3	14.2	20.3	4.3	694.4
M30-W8	161.5	221.4	117.3	162.8	98.4	109.7	47.4	54.0	41.9	26.8	30.1	22.3	5.4	-	-	-	-	1,099.0
M24-E10	39.5	73.4	281.7	237.0	89.1	211.4	104.7	113.4	14.5	111.6	38.8	53.9	35.3	1.6	-	-	-	1,405.9
M24-E12	29.3	126.6	186.5	316.5	220.7	101.5	73.3	15.5	16.8	43.4	64.6	52.4	24.6	7.8	0.7	-	-	1,280.2
M26-E10	123.2	49.7	177.0	222.3	104.3	90.5	187.1	89.4	76.9	32.4	17.4	9.5	53.3	83.9	25.7	-	-	1,342.6
M26-E12	82.9	92.1	226.8	129.7	111.9	97.3	21.7	54.4	38.0	38.8	11.3	23.4	-	-	-	-	-	928.3
M28-E12	130.5	195.4	114.0	80.1	66.8	49.4	75.3	54.4	59.0	33.7	42.1	106.6	86.6	9.9	5.2	-	0.6	1,109.6
M28-E14	3.6	81.0	41.7	27.3	84.8	55.8	47.3	34.8	47.0	57.6	48.1	30.5	23.3	18.3	7.7	-	-	608.8
M41-E2	15.9	45.3	129.1	123.7	84.6	127.1	70.3	53.6	83.3	91.7	199.4	108.1	122.5	37.6	58.1	40.3	7.5	1,398.1
M48-W14	37.3	78.4	16.5	32.2	-	14.8	10.1	-	-	-	-	-	-	-	-	-	-	189.3
M50-E29	76.5	47.5	76.0	42.2	24.3	15.9	7.1	-	-	-	-	-	-	-	-	-	-	289.5
S1-E21	-	0.1	-	1.4	0.2	-	-	-	-	-	-	-	-	-	-	-	-	1.7
M6-W11	8.3	8.3	-	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	16.7
M27-E44	2.9	4.2	1.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8.6
Total	1156.3	1586.4	2039.0	1701.2	1347.0	1253.5	968.1	773.2	599.8	628.8	565.0	471.1	379.1	192.4	124.1	60.6	12.4	13,858.0

These specimens, made from sandstone, have extensive grinding on one side. The complete specimens have rectangular outlines with rounded edges. Nine edges are extensively battered and pecked, three have slight amounts of battering, and the remainder are unaltered except for rounding.

#### BIFACIAL MANOS

Category 63 (03-01-02A) N=22: 4 Complete, 18 Fragmentary (Figure 23 b)

This category is similar to the preceding one except that both sides of each loaf-shaped, sandstone specimen are extensively ground. They have round to square edges. Eight specimens are heavily battered and/or pecked along the edges, four are slightly battered, and ten are not altered.

#### PITTED MANOS

Category 64 (03-01-04A) N=14: 10 Complete, 4 Fragmentary (Figure 23 c-e)

These sandstone artifacts have ground surfaces in addition to pecked depressions. Seven are ground on only one side. Two have single U-shaped depressions on the ground side, three have U-shaped depressions on the unaltered side, and two have U-shaped pits on both sides. The depression on one specimen is elongated and the rest are concentric. The average diameter of the depressions is 17.9 mm and the depth is 2.4 mm. Edges of these artifacts are rounded, but only two are battered and pecked along the edges.

Five specimens have bifacial grinding and rounded edges which are slightly battered and pecked. Three have U-shaped, concentric (2) or elongated (1) depression on both sides. The other two manos have concentric, U-shaped depressions only on one side. The average diameter of the depressions is 15.4 mm and depth is 2.6 mm.

#### METATES/GRINDING SLABS

Category 65 (03-02-01A) N=5: 5 Fragmentary (Figure 23 f)

One specimen is slate and the rest are sandstone. They are, for the most part, ground on one side. A slight amount of grinding is evident on the opposite side of two artifacts. Edges are rounded and unaltered. One specimens has a large (128.0 mm) concave area in its center. It is 9.7 mm deep.

*CELTS*

Category 66 N=2: 1 Complete, 1 Fragmentary (Figure 23 g-h)

The complete specimen is from a hard, black basalt-like stone. The poll (butt) is rounded, convex, and battered. The bit end is wide and 6.2 mm thick. The working edge is relatively sharp and has a number of small nicks, longitudinal striations, and polish along the edge. Long, thin, perpendicular striations are also evident on the rest of the bit. The body is extensively ground and numerous irregular striations are apparent. It is 70.9 mm long, 45.4 mm wide, and 22.3 mm thick.

The broken artifact is quartzite and tapers to a pointed end. Pecking and grinding are evident on all surfaces, and parallel striations are apparent on one side. The pointed end is extensively crushed. It has a circular cross section. Even though it is broken in the middle, this specimen is 63.4 mm long, 48.6 mm wide, and 36.4 mm thick.

*GROUND/WORKED HEMATITE***BOATSTONE**

Category 67 N=1: 1 Complete (Figure 23 i)

This specimen, from specular hematite, has a semi-oval outline. The thick end is flat, but the edges are convex. A 1.3 mm deep groove is engraved along the edges. A slight ridge divides the groove which extends three-fourths of the way around the specimen. All surfaces are ground, smooth, and exhibit numerous irregular striations. It measures 32.2 mm in length, 48.0 mm in width, and is 18.2 mm thick.

**MISCELLANEOUS GROUND SPECULAR HEMATITE**

Category 68 (03-04-02A) N=2: 2 Fragmentary (Figure 23 j-k)

One specimen, broken in the middle, may have a rectangular outline even though one side is broken except for a small ground section of one end which is flat and wedge-shaped. The other side is ground and polished and numerous irregular striations are evident. It is 49.5 mm long, 36.4 mm wide, and 17.0 mm thick. It may represent a boatstone or gorget fragment.

Figure 23. Selected ground stone implements from the Bug Hill site (34Pu-116).

a: Category 62

b: Category 63

c-e: Category 64

f: Category 65

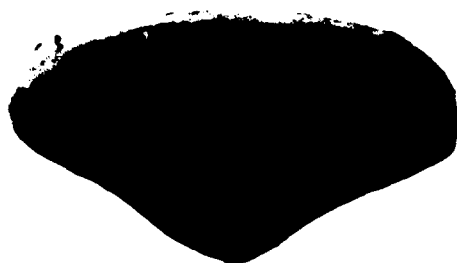
g-h: Category 66

i: Category 67

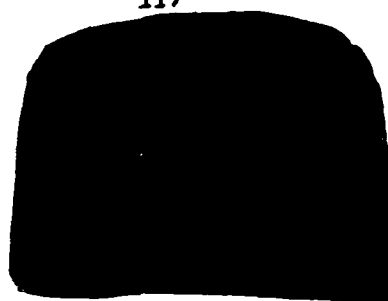
j-k: Category 68

NOTE: a-e displayed at 10 cm scale shown.

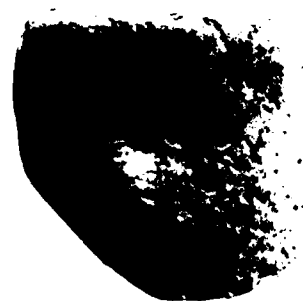
117



A



B



C



D



D



10CM



E



F



G



H



I



5 CM



J

The other specimen has a circular outline which is ground and smoothed on all surfaces. The majority of one side is split, and there is evidence of chipping along one edge. The opposite side is also split, has a pock-marked appearance, and there is evidence of chipping along one edge. The other edges are ground and thinned. It is possible that this is a celt fragment. It is 52.4 mm long, 43.8 mm wide, and 16.0 mm thick.

#### MODIFIED HEMATITE

Category 69 N=20.

These are small, ground pieces of hematite. The majority are rubbed smooth on one side and exhibit numerous irregular striations. Lateral edges are rounded. There are an additional 85 pieces of unmodified hematite.

#### GROUND SANDSTONE/SLATE

#### GORGETS

Category 70 N=4: 4 Fragmentary (Figure 24 a-d)

These items are made from slate, and three specimens have been broken along an existing drill hole. One specimen is ground smooth and exhibits numerous striations over both sides. A decorative motif of two zig-zag lines, 6.2 mm apart, occurs on one side. These lines are incised on each side of the drill hole and extend to the rounded edges of the specimen. They are 17.0 mm long. Numerous striations are evident on the other side, but no motif is visible. This may be due to surface breakage of this side. The edges are ground. One end is flat and the other is slightly convex with a broken drill hole in it. The other drill hole is in the center and has been drilled from both sides. It has a diameter of 6.0 mm. The specimen is 44.5 mm long, 32.8 mm wide, and 6.8 mm thick. It is probably the end of a bar gorget.

Two other fragments have serrated edges. One is smoothed with parallel striations on both sides. It has two drilled holes, but one is broken. The other hole is drilled from both sides and has a diameter of 5.8 mm. Four rounded serrations are along one edge. They are 2.0 mm apart. This specimen is 5.8 mm thick. The other specimen is ground and striated on one face and has two drilled holes. The opposite surface is either unaltered or split. One hole is along an edge which is broken. The other hole is drilled from one side and has

a diameter of 6.0 mm. Three serrations, 3.7 mm apart, are along one edge. This specimen is 3.3 mm thick.

The final gorget fragment does not have any drilled holes, but its configuration suggests it may be part of a reel gorget. Both surfaces are ground and exhibit striations. The center is 8.4 mm thick and tapers to a thickness of 2.9 mm along the edge.

#### GROUND/POLISHED SANDSTONE AND SHALE

##### Category 71 N=4: 4 Fragmentary (Figure 24 e-f)

Three specimens are from sandstone. One has a 23.4 mm area which is smoothed, polished, and has a few striations. The other surface is unaltered. Another specimen is a circular pebble (9.4 mm long and 8.6 mm wide) which is smoothed. The third specimen has a rounded, convex dorsal surface. Grinding is evident along one edge which also has four diagonally engraved lines. The lines are 3.4-4.4 mm apart and approximately 19.0 mm long. The other side is unaltered except for an elongated U-shaped concavity in the center. It is 19.0 mm wide, 3.4 mm deep, and runs the entire length (56.9 mm) of the specimen. There is no evidence of grinding or striations in the concavity.

The fourth specimen is a small angular fragment of either claystone or shale. One surface is unaltered, but the other surface is ground and has five diagonal engraved lines cross-cut by a single line. One edge is rounded. It is 12.5 mm long, 14.5 mm wide, and 4.0 mm thick.

#### MISCELLANEOUS GROUND SANDSTONE/SLATE FRAGMENTS

##### Category 72 N=16 (Figure 24 h)

Seven specimens are sandstone which have at least one ground surface. Even though they are fragmentary, these specimens may be related to Category 60 (metates/grinding slabs). One specimen is a tabular piece of sandstone which is ground and pecked on one side. This side is characterized by a raised, rounded ridge 10.9 mm wide. Grinding is evident beneath the ridge. This specimen is 45.7 mm long, 51.8 mm wide, and 22.6 mm thick.

Nine specimens are slate fragments. One has grinding and striations on both sides and along one edge. The rest are striated and ground on one side. The other side is either unfinished or split. Two specimens, from a black slate, are polished.

# PECKED/BATTERED/UNMODIFIED COBBLES

## PITTED STONES

Category 73 (04-02-01A & 04-02-02A) N=41: 25 Complete, 16 Fragmentary (Figure 24 i-k)

These sandstone artifacts have U-shaped depressions pecked into either side or both sides. Additional modification is infrequent and usually consists of slight grinding or battering along the edges.

Twenty specimens are bipitted. One has three U-shaped depressions on each side. The remainder have one depression on each side. For the most part, the depressions are concentric and in the middle of each specimen. The average diameter of the depressions is 18.3 mm and depth is 2.7 mm. Five specimens are slightly battered along the edges, and one has grinding on one side.

The remaining 21 artifacts have single U-shaped depressions (19) or two U-shaped pits (2) on one side. Two are slightly crushed or battered on the edges and two have additional pecking or grinding on the same side as the depressions. The mean diameter of the depressions is 18.6 mm and depth is 2.3 mm.

## MISCELLANEOUS PECKED STONE

Category 74 (04-03-01A) N=14: 1 Complete, 13 Fragmentary (Figure 24 l)

The complete specimen is a small round sandstone cobble which is slightly ground and pecked on one surface. It is extensively battered and pecked along the edges, and may have been used as a hammerstone. The remainder are very fragmentary, but have evidence of pecking and grinding along edges and on flat sides.

## UNMODIFIED PEBBLES, NATURAL RESOURCES, AND FOSSILS

Category 75 N=25

This category is composed of natural resources and pebbles which are not modified, but do not occur naturally at the site. The largest number are quartz pebbles and crystals (15). Other resources are limestone (4), quartzite cobbles (2), and single examples of asphalt, slate, limonite, and an unmodified pebble. The latter object is from Feature 79-31 (Burial 7).

## Category 76 (04-04-02A) N=7

Six fossil fragments including two crinoid sections and four (three large and one small) *Schaphopod* fragments, and one piece of fibrous gypsum are represented in this category.

## COPPER

## COPPER TUBE

## Category 77 N=1 (Figure 24 g)

This is a rolled, hollow tube made from a thin sheet of copper. It is 34.8 mm long, 6.2 mm wide, and 0.9 mm thick. Its interior dimension is 5.0 mm.

Comments: This artifact was found in Level 6 (50-60 cm) in N28-E2. This level is characterized by a large, dark compact area, and it is probable that an ash/clay concentration (Feature 79-7) observed in Level 5 (40-50 cm) of this square extends to this depth. A stratigraphic date of  $298 \pm 60$  B.C. (Beta-1412) was obtained from Level 5 in this square.

Sixty-one pieces of green stained bone were also recovered. These occurred in most squares, but the majority (46) are confined to Levels 3-6 (30-70 cm). This may be copper staining and may suggest a more intense utilization of copper.

## WORKED BONE

## AWLS/PINS

## METAPODIAL AWLS

## Category 78 N=16: 4 Complete, 12 Fragmentary (Figure 25 a-e)

These items, divided into two varieties, are made from intentionally split deer metapodials. The first variety (A) is fashioned from sections of split cannon bone shafts. The other variety (B) is characterized by retention and modification of the distal end, apparently for use as a handle. One fragment is included within this variety, but the remaining fragmentary specimens cannot be assigned to either variety. Tip shapes range from sharp points with concave lateral margins to blunt ends with convex lateral edges.

Figure 24. Selected ground, pecked stone, and copper implements from the Bug Hill site (34Pu-116).

a-d: Category 70

e-f: Category 71

g: Category 77

h: Category 72

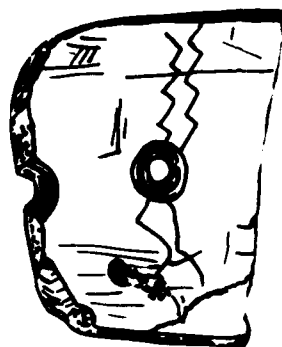
i-k: Category 73

l: Category 74

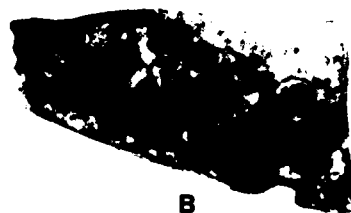
NOTE: i-l displayed at 10 cm scale as shown.



A



D



B



C



E



F



G



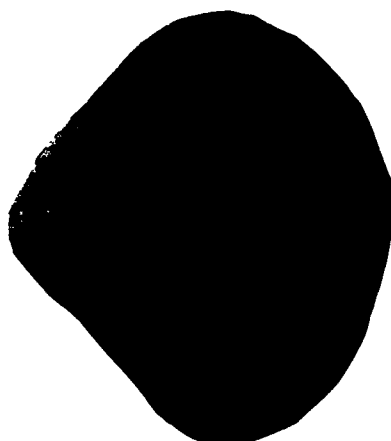
5 CM



H



I



J



K



L



10 CM

### Variety A

Three complete specimens are in this variety. These are 97.3-111.0 mm long, 13.9-15.0 mm wide, and 7.2-8.2 mm thick. Two are from metatarsals. In each case, the central portion of the shaft is used. Longitudinal striations, apparently resulting from manufacture, occur over the length of the specimens but are largely obscured by a light polish which covers most of the surface. The butt ends are fairly straight and perpendicular to the longitudinal axis. They are rough and appear to be shaped by bone flaking rather than grinding. On one specimen, flaking is more apparent and has thinned the end to a rough wedge shape. A red stain, possibly hematite, can be seen in the recesses of the intersecting flake scars on this artifact. The working ends have acuminate tips. The lateral margins of the working end of one specimen are slightly convex and highly polished with light, fine striations perpendicular to the long axis of the awl. The second specimen has concave lateral margins with coarse striations roughly perpendicular to the long axis. These striations are obscured by a heavy polish along the tip.

The third specimen is fashioned from a metacarpal shaft. The distal nutritive foramen is visible near the somewhat rounded butt end. This specimen has longitudinal striations over its entire length and light polish on most of the surface. The working end has an acuminate tip with straight to slightly convex lateral edges. Short, fine striations running diagonally to the long axis are visible on the lateral edges for a distance of 31.0 mm from the point tip. This area is also slightly darker in color and more highly polished than the rest of the specimen.

### Variety B

One complete and one fragmentary specimen represent this variety. The complete specimen is made from a metacarpal. The proximal end is removed and the shaft split along roughly three-quarters of its length. The distal epiphysis is heavily modified. The ridges of the articular surfaces have been removed and the remaining surfaces smoothed which exposed cancellous tissue in some areas. Rodent gnawing has subsequently exposed more cancellous tissue. Heavy polish extends from the distal nutritive foramen to the tip and partially obscures a series of large longitudinal striations, especially along the lateral edges and near the tip. The working end has slightly convex lateral edges tapering to a narrow, rounded tip. This specimen is 175.7 mm long, 24.5 mm wide, and 15.2 mm thick.

Only the fragmentary distal epiphysis of the second specimen was found. One articular surface is missing and the shaft is broken just above the nutritive foramen. The remaining articular surface is smoothed and shaped but the ridges have not been entirely removed. A heavy polish partially obscures longitudinal striations on the small portion of the remaining shaft.

The remaining specimens are too fragmentary to place in either variety. They are 28.3-106.5 mm long, 8.0-15.5 mm wide, and 4.5-7.5 mm thick. Like the complete specimens, they display longitudinal striations partially obscured by a heavy polish. The working ends of three specimens have concave lateral edges forming a narrow acicular tip on one specimen. The concave edges have striations oriented across the bone grain, either diagonal or perpendicular to the longitudinal axis. Two specimens have straight to slightly convex lateral edges on the working end. One has an acuminate tip and striations perpendicular to the longitudinal axis along the lateral edges. The other has a narrow, rounded tip with heavy polish along the lateral edges. Five specimens have working ends with straight to slightly convex lateral edges, but are too fragmentary to allow a description of the tip.

One specimen is sufficiently different to warrant a separate description. The entire surface except the original interior of the bone is highly polished. Beginning about 57.0 mm from the tip, heavy longitudinal striations cut through the polish along the lateral edges. These expand over the exterior surface near the tip and are cross cut by short, heavy diagonal striations along the lateral edges and tip. The striations on the tip are especially heavy. An old split near the tip has been repaired by removing the separated bone and smoothing the cut edges. Many of the striations are filled with a red substance, possibly hematite. The working end has convex lateral edges and a wide, blunt tip.

#### SPLINTER AWLS

Category 79 N=10: 10 Fragmentary (Figure 25 f-h)

These are large mammal or bird bone splinters sharpened at one or both ends. Modification is limited to preparing the tip although five specimens have light polish on the lateral margins and other surfaces. Worked surfaces display varying combinations of longitudinal, lateral, and diagonal striations. Striations near the acuminate tips of five specimens are obscured by polish. The tips of the others are broken. One specimen is worked on both ends to produce two points. Microscopic examination revealed a greater degree of crushing or battering on the tips of specimens in this category than observed for those of metapodial awls.

#### PINS

Category 80 N=4: 1 Complete, 3 Fragmentary (Figure 25 i-j)

The complete specimen is made from the proximal end of a turkey

Figure 25. Selected bone implements from the Bug Hill site (34Pu-116).

a-e: Category 78

f-h: Category 79

i-j: Category 80

k-n: Category 82



(*Meleagris gallopavo*) radius. The general shape of the bone is not extensively modified. The shaft is cylindrical, becoming slightly flat toward the distal end. Although part of the proximal facet is broken, the proximal end is relatively unmodified. The shaft is ground smooth and exhibits numerous striations, both longitudinal and diagonal to the bone axis. Near the proximal end, a series of short, non-continuous parallel cut marks placed laterally around the shaft terminate abruptly and uniformly as they approach the lateral edges. Patches of polish also occur along the shaft. The distal end is cut at an oblique angle and then smoothed to form a rounded tip. The length of this specimen is 123.3 mm and the diameter is 5.7 mm.

The three remaining fragments are the proximal end of a deer metacarpal, the proximal end of a possible deer tibia, and the distal end of a probable turkey tarsometatarsus. These items are placed in this category on the basis of morphological traits characteristic of the complete specimen described above. The shafts of these items are cylindrical to slightly flat in shape and exhibit striations and polish. Lengths of these fragments range from 5.0-10.1 mm. The two proximal fragments retain the original articular facets without much modification. The deer metacarpal, split longitudinally and subsequently ground smooth, retains only a portion of the proximal facet. The distal tarsometatarsus also has been obliquely cut and smoothed to form a blunt tip. No cut marks or design elements are present. While it is possible that these items could have functioned as perforating implements, their overall small size and blunt tips suggest that it is unlikely. They also may have served as hair pins or possibly clothing pins depending on the length of the specimen.

#### AWL/PIN FRAGMENTS

Category 81 N=85.

Midsection fragments (53) share many characteristics described for awls and pins. They appear to be fashioned from split deer metapodials, long bone splinters, or bird bones. Overall, they display striations, polish, and shapes similar to the shafts of specimens in the preceding categories. Their fragmentary nature, however, precludes distinguishing between awls and pins with any certainty.

Tip fragments (12) share characteristics with the tips of awls and pins but cannot be confidently separated into either group. All have straight to convex lateral edges. Eight have broken tips while four have acuminate tips. Longitudinal and lateral striations are present, but polish obscures them near the end of the tips.

*BONE FLAKERS*

## ULNA FLAKERS

Category 82 N=3: 2 Complete, 1 Fragmentary (Figure 25 k-n)

These implements, produced from deer ulnae, presumably were used for pressure flaking. The proximal ends of the complete specimens, while exhibiting some smoothing and edge rounding, show no major alterations of the bone. The shafts are cut and tapered to form a relatively flat, blunt tip. Microscopic examination of the tips indicates considerable dulling of the edges and numerous nicks suggesting battering or crushing of the edges. Polish is confined to areas along the shaft and tips. Striations along the shaft are primarily longitudinal and may be the result of manufacturing techniques rather than use. Striations on the tip area of two specimens cross cut the grain of the bone and may indicate use. The complete implements vary in size from 58.8-148.3 mm (length), 20.3-34.6 mm (width), and 15.9-18.8 mm (thickness).

## MISCELLANEOUS BONE FLAKERS

Category 83 N=7: 1 Complete, 6 Fragmentary

Although these items are assumed to have been involved in pressure flaking, they have been separated from the preceding group on the basis of two characteristics: 1) they are produced primarily from long bone sections of deer and other unidentifiable mammals and 2) the tips are round and blunt in cross section. Three specimens have a heavy polish along the entire shaft, while polish visible on the rest is restricted to tip areas. The majority (5) have round, smooth tips with little evidence of use. Two specimens have signs of battering/crushing which resulted in the removal of small flakes from the distal tip. The complete item is 51.1 mm long, 6.0 mm wide, and 4.7 mm thick. The proximal end of this specimen is cut and tapered. It also has parallel cut marks on the lateral edges which may indicate it was hafted. Striations are primarily longitudinal, but diagonal striations also occur along the lateral margins near the tip of four specimens.

*FISHING IMPLEMENTS*

## FISHHOOKS

Category 84 N=4: 4 Fragmentary (Figure 26 a-b)

Webb (1974: 287-289) describes the technique used to produce fish-hooks at the Indian Knoll site. A bone spatula was produced into which an elongated slot was cut. After the slot perforated the spatula, it was expanded and developed to form a subrectangular loop. The loop was further worked and polished. Finally, the distal end of the loop was cut off with one side left longer than the other. This formed the hook which was then finished by polishing and sharpening. In this way, hooks could be produced from the long bones of large mammals, small mammals, and birds. An alternate technique is illustrated by Guilday, Parmalee, and Tanner (1962: 77-78) in which deer phalanges were longitudinally split and fishhooks fashioned from the two halves.

Two specimens from 34Pu-116 appear to have been broken during manufacture while the other two may have been completed before breaking. Those broken during manufacture appear to have been produced by the technique described by Webb (1974). In both cases, a central perforation has been made in bone spatulas from what appear to be long bones of small animals. The perforation in one was produced by abrasion. Deep, longitudinal striations are visible at the end of the perforation. Finer, lateral and diagonal striations are visible along the sides of the two projections and the portion which forms the shaft is split longitudinally and broke during manufacture. The point of the hook displays very fine longitudinal and lateral striations and polish from sharpening. The tip still retains the flat surface from cutting away the rest of the spatula. The other specimen was split longitudinally leaving only a portion of the incomplete shaft and the unfinished curve of the hook. Unlike the first specimen, the central perforation is produced by cutting rather than abrasion. A lateral cut mark extends across the piece at the end of the perforation. Longitudinal striations and polish are visible along the shaft and lateral striations can be observed along the exterior of the curve.

Two fragmentary specimens seem to have been completed before they were broken. One represents the broken shaft of a hook while the other consists of the shaft and a portion of the curve of the hook which is split longitudinally along the grain of the bone. Both display longitudinal and lateral striations from manufacture. A rough, lateral groove has been cut near the head of the shaft of both specimens, possibly to aid in attachment of a line. These specimens were most likely produced by the technique described by Webb (1974), but the possibility that the former specimen was produced from a deer phalange cannot be eliminated.

#### FISHHOOK DEBRIS

Category 85 N=9: 9 Fragmentary (Figure 26 c-e)

When the distal end of the bone loop is removed to make a fish-hook, the remaining portion of the bone retains uneven prongs

and a central depression which represents the remnants of the loop. Webb (1974: 286) described these as forked spatulas and convincingly argued their status as fishhook debris. The specimens from 34Pu-116 display striations and cut marks from the preparation of the central perforation and the removal of the hook. Five display the uneven prongs described by Webb (1974: 286). The other specimens have broken prongs or have been cut even with the edge of the central perforation.

#### *BEAMERS*

Category 86 N=8: 8 Fragmentary

These probably are sections of deer metapodials which have been split longitudinally and ground smooth on at least one lateral edge. Beveled edges apparently served as working edges, possibly involved in hide scraping activities. Longitudinal striations are apparent on the entire surface of these fragments, while lateral striations or those occurring perpendicular to the working edge are generally on one face of the working edge of five specimens. Continuous polish is present on all fragments.

#### *SPATULATES*

Category 87 N=18: 18 Fragmentary (Figure 26 f-h)

These specimens, made from unidentifiable mammal bone, have flat to concave cross sections, blunt tips, longitudinal striations, and a light to heavy polish. One item is manufactured from a split bird long bone. The function of these fragments cannot be determined, but it is possible they served as flakers or as raw material for fishhook production.

Tip shapes are blunt and flat. Numerous longitudinal striations are visible on both faces and diagonal striations are present around the lateral margins where it has been split, as well as an oval shaped cut and ground surface on the dorsal face. This latter attribute is suggestive of a manufacturing stage in the production of fishhooks which occurs prior to the perforation of a central notch (Webb 1974).

Twelve specimens are flat midsections of unidentifiable mammal bone. Striations are primarily longitudinal and there is no evidence of cut marks or surfaces. Polish is extremely heavy on several items.

*SPLIT METAPODIAL*

Category 88 N=2: 2 Fragmentary (Figure 26 j)

These metatarsals are split longitudinally along the lateral plane. The more complete specimen, recovered from Feature 79-31 (Burial 7) retains most of the proximal end. The distal epiphysis has been broken. The interior surfaces display large, irregular gouges and cut marks probably from initial splitting of the shaft. Longitudinal cut marks along the lateral margins of the proximal end indicate the metatarsal was split from the distal to the proximal end. The irregular edges of the proximal end suggest the shaft was then broken rather than cut away. Longitudinal striations and polish on the cut edges indicate at least an initial attempt to smooth and shape the shaft. The exterior surface, which includes the vascular groove, shows no attempts at modification. Like the first, a more fragmentary specimen displays irregular edges along the interior surfaces. Modification of these surfaces, however, is much more pronounced. Abrasion, in the form of longitudinal striations and polish, has rounded the edges and almost obliterated the cut marks from the initial splitting. This has also removed much of the cancellous tissue from what is believed to be the distal end. Only a light polish and a few longitudinal striations suggest an attempt to modify the exterior surface. These items are unfinished and believed to represent manufacturing stages in producing metapodial awls or pins.

*BONE TUBES*

Category 89 N=3: 2 Complete, 1 Fragmentary (Figure 26 k-m)

These items, from Feature 79-31 (Burial 7), are made from long bones with the epiphyses removed and the interior reamed sufficiently to form a hollow tube. One specimen is a long bone (humerus?) of a large bird while the other two may be mammal femurs, possibly from large carnivores (felids?). More specific identification could not be made since identifying features are cut or ground away.

The bird bone tube is 194.6 mm long, 27.5 mm wide, and 14.5 mm thick. Rodent gnawing has badly damaged what is believed to be the proximal end and has produced three large, irregular holes. Cut marks and polish are evident on the ends indicating the deliberate removal of the epiphyses. The exterior surfaces display longitudinal striations and polish, especially near the ends where there is an apparent attempt to smooth the muscle scars.

Two tubes are from carnivore femurs. They are 200.2-211.8 mm long and 30.9 mm wide which suggest they are from large animals. In

both cases, most of the epiphyses have been removed and the edges smoothed and polished. On one specimen, the lesser trochanter was left intact. This may be true of the other specimen but rodent gnawing of the ends makes this difficult to determine. The cancellous tissue of both have been partially removed and the interiors are hollowed to form tubes. The exterior surfaces are longitudinally striated and polished. This suggests that abrasion was used to remove the original features of the bone and to regularize the shaft. The larger of the two tubes has an incised cross-hatch design near each end. At the proximal end, the design is on the posterior surface while on the distal end it is on the anterior surface. The incisions are fine and shallow, and the lines irregularly spaced.

The function of these tubes is unknown. The bird bone tube is similar to those described by Webb (1974) as handles for gravers using rodent teeth as blades. It is somewhat larger than those described, however, and it is questionable whether it would have been substantial enough for such activities.

#### *DECORATED ULNA*

Category 90 N=1: 1 Fragmentary (Figure 26 i)

This is a decorated deer ulna. The decoration consists of a series of deep, parallel and V-shaped notches which are cut into the anterior and posterior margins of the base. The V-shaped notches are confined to the margin around the proximal end extending to the semi-lunar notch. The parallel, straight notches begin at the semi-lunar notch and continue along both the anterior and posterior margins of the shaft. The distal end is missing and the medial facet has been removed and ground smooth. The olecranon process at the proximal end also has been removed and the remaining surface has been hollowed to a depth of approximately 3.2 mm. A relatively high polish is visible on the surface and obscures many of the striations, the latter being most evident across the semi-lunar notch. The broken surface of the shaft displays rounded edges and a light polish. The length of this item is 96.5 mm and its function is unknown. The series of notches suggest usage as a rasp (possibly musical). However, the hollowed depression at the proximal end may indicate usage as a container or handle.

#### *BEADS*

Category 91 N=9: 7 Complete, 2 Fragmentary (Figure 27 a-e)

These tubular beads are primarily made from the radius and ulna of small and large birds, including turkey. They are cylindrical in

Figure 26. Selected bone implements from the Bug Hill site (34Pu-116).

a-b: Category 84

c-e: Category 85

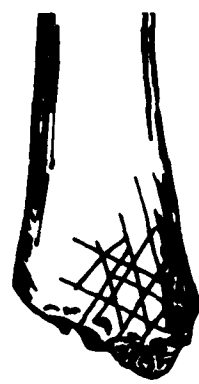
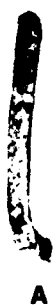
f-h: Category 87

i: Category 90

j: Category 88

k-m: Category 89

NOTE: j-m displayed at 10 cm scale as shown.



shape and are 10.2-73.1 mm long and have a diameter of 2.9-9.1 mm. The fragmentary specimens exhibit one cut and ground end and one broken, irregular end. The ends on the complete items are squarely cut and ground smooth. Cut marks were frequently observed, and polish and striations are apparent along the shaft of all beads.

#### *PENDANTS*

##### *CANINE PENDANTS*

Category 92 N=6: 2 Complete, 4 Fragmentary (Figure 27 f-h)

These have been cut and ground along the proximal margin to form a smooth, rounded edge. All specimens have a perforation near the proximal end, the largest measuring 3.2 mm in diameter. Longitudinal striations and polish are visible and the distal tips are well rounded. The largest specimen is 37.0 mm long, 10.3 mm wide, and 6.5 mm thick.

##### *INCISOR PENDANTS*

Category 93 N=1: 1 Complete (Figure 27 i)

This specimen, made from an unidentifiable rodent incisor, is squarely cut at the proximal end and subsequently ground and polished. Longitudinal striations are present on all surfaces. The lateral edges are perforated near the proximal margin. While it is possible that this item formed a part of a composite tool such as a chisel or graver, the high degree of polish, the perforation, and lack of use wear along the distal edge suggests use as a pendant.

#### *WORKED RODENT TEETH*

Category 94 N=7: 1 Complete, 6 Fragmentary (Figure 27 j-k)

These specimens are made from beaver incisors. The complete item is squarely cut and ground along the proximal edge and the distal margin is ground to create a beveled edge. It is 21.6 mm long and 8.0 mm wide. The other fragments have signs of shaping along the distal margins and cut marks near the proximal end. Although there is no evidence to indicate that these items were hafted, they may have been used as gravers or chisels.

#### *ENGRAVED AND CUT BONE*

## ENGRAVED BONE

## Category 95 N=6: 5 Fragmentary

This category includes unidentifiable fragments of mammal, bird, and turtle bone that are surficially engraved. Three small mammal fragments exhibit the following decorative patterns: 1) parallel notching along both lateral edges, 2) cross hatching, and 3) small clusters of six to seven short, parallel lines. The turtle bone fragment has a combination of parallel lines and cross hatching and the bird bone has what appears to resemble an asterisk in combination with two parallel lines. The latter fragment is split longitudinally and subsequently ground smooth along lateral edges. It has a high degree of polish and is morphologically similar to the spatulate fragments described previously. The remaining fragments, except the turtle bone, also show signs of polish and striations.

## CUT BONE

## Category 96 N=12: 12 Fragmentary (Figure 27 1-m)

These items include deer, turtle, fish, bird, and unidentifiable bone fragments exhibiting cut marks and/or surfaces. Most do not have other signs of wear or use. Two deer fragments, however, have striations and polish in addition to cut marks. One deer mandible fragment is cut just proximal to the first premolar and has numerous striations longitudinal and perpendicular to the axis of the bone. Another deer fragment is a metatarsal section displaying longitudinal striations particularly along the vascular groove.

*BONE WITH RED OCHRE*

## Category 97 N=3: 3 Fragmentary

These are mammal, probably deer, long bone splinters. They are characterized by red ochre or hematite stains occurring along various areas of the bone, primarily in recesses. Two fragments with striations and polish have smooth, rounded edges.

*MISCELLANEOUS WORKED BONE FRAGMENTS*

## Category 98 N=3

These items are too fragmentary to be adequately separated into

any of the preceding categories. They exhibit either striations, grinding and reshaping, polish, or any combination of these attributes. The majority are splinters or sections of mammal and bird long bones. Notable species are turkey, raccoon, and dog/coyote. One distal end of a dog/coyote fragment has numerous longitudinal striations and polish along the shaft.

#### WORKED ANTLER

##### *BILLETS*

Category 99 N=3: 3 Complete (Figure 27 s-u)

Although these specimens are extensively modified by rodent activity, their general morphology, the presence of cut marks, ground surfaces, and battered edges suggest placement in this category. They consist of deer antler sections cut at the base along the burr area. Two are from Feature 79-31 (Burial 7). They have a light polish around the end margin as well as along the shaft. Visible striations on the cut surfaces of the end margins suggest subsequent grinding and smoothing of these areas. Battering is indicated by well rounded edges and the presence of various nick marks around the proximal and distal margins. The third specimen is extremely eroded and has no evidence of polish or striations. Cut surfaces occur at the base and various cut marks are visible along the shaft. The general morphology of this item is congruent with the previous specimens. Size dimensions for this category range from 110.2-150.1 mm in length and 22.3-31.6 mm in thickness. It is probable that these items were used in percussion flaking activities associated with lithic tool manufacture.

##### *FLAKERS*

Category 100 N=54: 9 Complete, 45 Fragmentary (Figure 27 n-p)

This is the most numerous category of antler implements from 34Pu-116. Forty-five fragments represent deer tine tip sections. The nine complete specimens include portions of the antler shaft. The latter vary in length from 40.7-112.3 mm and display uneven breaks at or near the base. Possible cut surfaces are present along the basal area of one specimen and may indicate hafting of this item. These specimens are generally round in cross section and have been cut and tapered along the shaft from the base to the tip. Polish and/or striations occur along the shafts. Only one specimen in the latter group retains a complete tip. This is extremely blunt (almost squared) and appears to indicate uniform usage of the tip area. Numerous nick marks and short, deep striations are apparent on the extreme distal surface of

this tip. The remaining tip fragments display varying degrees of polish and striations. They have been divided according to tip shape and include uniformly rounded (14), uniformly blunt to squared (7), faceted on one side only (6), and broken (18). While these implements have been grouped primarily according to general morphology, it is assumed that they were involved in activities associated with pressure flaking lithic implements.

#### *HANDLES*

Category 101 N=4: 2 Complete, 2 Fragmentary (Figure 27 q-r)

Items in this category are badly eroded and disturbed by rodent activity. They have been included under the heading of handles since all specimens represent deer antler sections which have cut marks at one or both ends as well as hollowed depressions or cavities. Cut surfaces, subsequently ground smooth, are present on both end margins of two specimens and one end margin of the remaining two. Three items have completely hollowed interiors formed by the removal of cancellous material. One fragmentary specimen has a light polish and longitudinal striations along the shaft and is tapered toward the distal end. It is also split along the shaft which could have occurred as a result of a blow to the proximal end. The remaining three items do not have polish or striations, but they display cut marks along the shaft and end margins. Size dimensions for this group are 19.3-49.3 mm (length) and 13.5-27.5 mm (width). Three specimens are cylindrical in shape while the fourth is relatively flat and represents the juncture of the tine and antler shaft. The function of these items is difficult to assess, but it is suggested that they represent handles of composite tools.

#### *MISCELLANEOUS WORKED ANTLER*

Category 102 N=21: 21 Fragmentary (Figure 27 v)

This category includes unclassifiable antler fragments which have one or any combination of the following attributes: 1) striations, 2) polish, 3) cut marks on surfaces, and 4) reshaping. Generally, these fragments can be divided into two morphological groups: 1) round or cylindrical fragments and 2) flat, spatulate fragments. Two of the larger cylindrical items are cut and ground near the base and appear to have been at least partially hollowed in the center. It is possible that these specimens may have been intended to serve as handles for composite tools, but their fragmentary nature prohibits further distinction. Another fragment, cut near the base, is split longitudinally and subsequently ground into a wedge shape. Finally,

Figure 27. Selected bone and antler implements from the Bug Hill site (34Pu-116).

a-e: Category 91  
f-h: Category 92  
i: Category 93  
j-k: Category 94  
l-m: Category 96  
n-p: Category 100  
q-r: Category 101  
s-u: Category 99  
v: Category 102

NOTE: s-v displayed at 10 cm scale as shown.



an antler section (150.2 mm long) from Feature 79-31 (Burial 7) has been cut at the base and subsequently ground along the shaft so that the inner margin of the curve near the distal tip is thin, increasing in thickness toward the outer margin.

## WORKED SHELL

### MARINE SHELL

#### PENDANTS

Category 103 N=2: 1 Complete; 1 Fragmentary (Figure 28 a-b)

Both items are manufactured from conch shell. The complete specimen was recovered from Feature 79-19 (Burial 3). It has a roughly oval to tear-drop shape with a single perforation near one end. This item is 43.1 mm long, 41.2 mm wide, and 4.6 mm thick. The perforation has a 6.5 mm diameter. Striations are visible, particularly along the well-rounded edges. The second specimen, although fragmentary, appears to be rectangular in shape. It is characterized by two perforations, one of which is larger than the first (3.8 mm and 2.6 mm in diameter respectively). Both occur near the end of the artifact. Striations and polish are present on both faces. This item is 25.9 mm long and 3.4 mm wide.

#### BEADS

Category 104 N=11: 10 Complete; 1 Fragmentary (Figure 28 f-o)

These items are fashioned from *Marginella* shells. A small perforation is ground into the body of the shells near the orifice. No polish was observed, but small striations occurring around the perforations due to grinding were noted on several specimens. No other modifications were observed.

### MISCELLANEOUS WORKED MARINE SHELL

Category 105 N=1: 1 Fragment

This specimen is an unidentifiable marine shell fragment exhibiting numerous striations on the outer surface. The striations intersect and do not appear to be confined to any particular area of the shell.

## FRESHWATER SHELL

## PENDANTS

## Category 106 N=6: 6 Fragments (Figure 28 c-e)

These items include various sized fragments of mussel shell which have small, single perforations. Species identification consists of one *Amblema costata* (three-ridge), two possible *Actinonaias carinata* (mucket), and three unidentifiable fragments. The perforations range in diameter from 1.5-3.1 mm and are either near the center of the fragment (1) or near an edge (5). Striations are visible along the edges of the perforations. Shapes are generally irregular or oval and these artifacts range in size from 22.3-50.6 mm (length), 15.3-37.8 mm (width), and 4.3-17.0 mm (thickness). The edges of two specimens are cut and/or ground to form smooth, well-rounded edges. One specimen is from Feature 79-19 (Burial 3).

## BEADS

## Category 107 N=1: 1 Complete (Figure 28 p)

This item is identified as belonging to the family *Succineidae*. A single perforation is ground into the body of the shell near the orifice. Small striations resulting from grinding are apparent around the edge of the perforation. No further modification was observed. It is assumed that this item, like the marine shells, was used as a bead.

## MISCELLANEOUS WORKED FRESHWATER SHELL

## Category 108 N=6: 6 Fragments.

These specimens consist of mussel shell fragments that exhibit one or more cut and/or ground edges. Only one fragment is identifiable as to species (*Tritogonia verrucosa* or pistol-grip). Three specimens have flat, smooth cut edges. Two items have well-rounded edges, possibly due to grinding activities. The final fragment has numerous striations and polish on one face. The function of these items is difficult to determine, but some may have been used as scrapers while others may have simply provided raw material for the manufacture of other shell items.

## HISTORIC REMAINS

*CROCKERY*

## SALT GLAZE STONEWARE

Category 109 (07-02-01A) N=2 (Figure 28 q)

These are undecorated body fragments of a stoneware vessel. Wiping marks are evident on the interiors. One is 7.0 mm thick and the other is 7.5 mm thick.

*IRONSTONE*

## BLACK BANDED WARES

Category 110 N=6 (Figure 28 r)

These body sherds are light bluish-green with black bands on a white background. The bands are 2.5 mm wide and the same distance apart. One sherd is split, but the rest of the interiors are white. Thickness ranges from 3.5-4.7 mm with an average of 4.2 mm.

## BLUE BANDED WARES

Category 111 N=6

One specimen is a rim sherd with a rounded lip and the rest are body sherds. Three are split. Exteriors are blue or have blue bands placed on a white background. The bands are 2.7 mm wide and the same distance apart. Interiors are white. These specimens range in thickness from 3.8-4.6 mm with an average of 4.1 mm.

## BLUE FEATHER EDGE WARES

Category 112 (07-02-02A) N=6

The sample includes four body sherds of which two are split and two rim sherds with rounded lips. These specimens have blue feathering placed on a white background. The obverse side is white. The lips

on the rim sherds are a solid blue, and the feathering extends 10.7 mm from the lip. Two sherds are 5.0 mm thick and two are 5.5 mm thick.

#### BLUE SPONGED WARES

##### Category 113 N=1 (Figure 28 s)

This is a body sherd, 4.0 mm thick, with an irregular blue sponged design on a white background. The obverse side is white.

#### POLYCHROME HAND PAINTED WARES

##### Category 114 N=1 (Figure 28 t)

This is a rim sherd with a rounded lip. One side is white, but the other side has a green line (1.4 mm wide) parallel to the lip, and a dark red and green floral design placed on a white background. It is 4.0 mm thick.

#### TRANSFER WARES

##### Category 115 N=3 (Figure 28 u)

One side of these body sherds is white, but a transfer has been placed on the obverse side prior to glazing. All of the designs are indistinguishable, but the largest specimen has a blue and purple design and the others only a purple design. They range in thickness from 5.0-5.5 mm with an average of 5.2 mm.

#### UNDECORATED WHITE WARES

##### Category 116 (07-02-02B) N=28 (Figure 28 v)

Four of these are rim sherds and the remainder body sherds of which 12 are split. The rims have rounded lips. The exteriors and interiors are white. It is probable that many of these fragments are associated with the preceding categories. Thickness ranges from 4.2-7.5 mm with an average of 5.7 mm.

#### GLASS

**GREEN GLASS****Category 117 N=3**

These are tiny fragments of translucent green glass ranging from 1.7-3.7 mm in thickness.

**CLEAR GLASS****Category 118 (07-01-01A) N=1**

This is a 2.0 mm thick piece of clear, translucent glass.

**BROWN GLASS****Category 119 (07-01-01D) N=1**

This is a basal fragment of translucent, brown glass. No seams or maker's marks are apparent. A purplish gray patination is evident on the exterior of the specimen. Thickness varies from 3.9-6.0 mm.

***MISCELLANEOUS FIRED MATERIAL*****Category 120 N=1**

This consists of an amorphous lump of either coal or asphalt.

***AMMUNITION*****Category 121 (07-03-06) N=1**

This is a Ward's Western Field .12 gauge shotgun shell casing. It is 15.3 mm long and has a diameter of 20.5 mm. A concentric engraved cross hatch design, 2.7 mm wide, occurs 8.5 mm from the base. The base has a diameter of 22.3 mm.

**Category 122 (07-03-06) N=1**

This is a lead slug from a .25 caliber automatic pistol. Its diameter is 5.6 mm and it is 8.5 mm long. Three concentric lines, 1.3 mm apart, occur on the body of the slug.

## Category 123 (07-03-06) N=1

This is a Peters Super X .22 caliber long rifle brass shell casing. It is 15.5 mm long. The body has a diameter of 5.8 mm and the base has a diameter of 6.9 mm.

*METAL OBJECTS*

## Category 124 (07-03-09) N=1

This is a complete corroded safety pin. It is 3.7 mm long.

## Category 125 (07-03-09) N=1

This is a corroded piece of metal wire. One end is bent to form a U-shaped hook. It has a diameter of 3.2 mm and is 125.7 mm long.

## Category 126 (07-03-09) N=2

One specimen consists of a corroded square metal nut, 11.4 mm in diameter, which has a 5.5 mm wide circular thread hole. The other specimen is a corroded nut, bolt, and washer which has a slight amount of dark green paint adhering to it. The nut is octagonal and has a diameter of 13.0 mm. The bolt is circular, 82.4 mm long and 26.7 mm of one end is threaded. The head of the bolt is square and has a diameter of 12.7 mm. The washer is circular with a diameter of 25.4 mm and the holes is 10.0 mm wide.

## Category 127 (07-03-09) N=1 (Figure 28 w)

This slightly corroded square nail appears to be machine made. The end of the shaft is broken but it is 31.6 mm long, 5.6 mm thick, and the head has a diameter of 6.0 mm.

## Category 128 (07-03-09) N=1

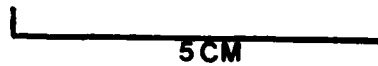
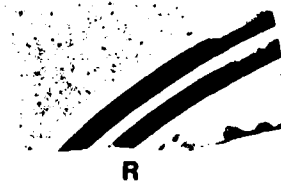
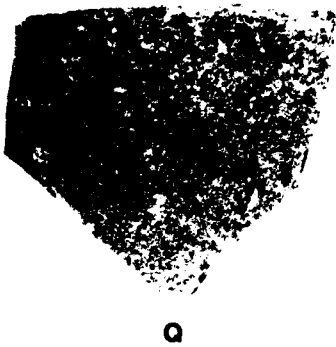
This is a chrome steel retaining ring. The exterior diameter is 12.6 mm and the interior is 8.6 mm.

## Category 129 (07-03-09) N=1 (Figure 28 x)

This specimen, 36.6 mm long, may either be part of a gun or gear. One side is convex and grooved. The other side is straight, but has a 10.0 mm wide concave area. One end is flat, and has a 15° angle. A similar item was recovered from the Wheeler Lee site, 34Pu-102 (Lintz n.d.).

Figure 28. Selected shell implements and historic artifacts from the Bug Hill site (34Pu-116).

a-b: Category 103  
c-e: Category 106  
f-o: Category 104  
p: Category 107  
q: Category 109  
r: Category 110  
s: Category 113  
t: Category 114  
u: Category 115  
v: Category 116  
w: Category 127  
x: Category 129



Category 130 (07-03-09) N=1

This is a 45.0 mm long piece of tapering lead. The widest end has a diameter of 7.8 mm and the narrowest end has a diameter of 3.6 mm.

Category 131 (07-03-09) N=40

This category consists of small, corroded metal scraps. Two appear to be rims and have folded, rolled lips. Three pieces are curved and may be parts of a plow share. Thickness ranges from 0.7-3.6 mm with an average of 1.5 mm.

## VI

### FAUNAL AND FLORAL REMAINS

#### FAUNAL REMAINS

Next to lithic debitage, faunal remains constitute the greatest amount of material recovered from the Bug Hill site. Approximately, 250,000 vertebrate remains, 768 identifiable mussels, and 13,871 gastropods were recovered. It is estimated that 66% of the vertebrate fauna represents mammals, 23% turtle, 6% bird, less than 1% fish and snake, and 5% indeterminate.

Because of the large amount of vertebrate fauna, a sampling design was employed in the analysis. This is a random sample based on arbitrary levels in each square, and 25% of the levels were sampled (Table 12). Prior to the sample design, all vertebrate fauna from N28-E12 and N28-E2 were analyzed (Tables 13 and 14). These squares were selected because N28-E12 was the deepest excavated square (180 cm) and N28-E2 contained the 1 m x 1 m control square in its southeast corner. The control square was excavated in 5 cm levels. All sediments were waterscreened and a five liter sample from each level was obtained for flotation. For comparability, the 5 cm levels are combined into 10 cm units. The identified remains (8,224) make up approximately 10% of the total recovered in these levels.

#### *FISH*

The only identified species of fish were gar, catfish, and drum. The majority of these are from N28-E2, and were recovered as a result of waterscreening and flotation. Vertically, the greatest amounts are from Levels 6-10 (50-100 cm). The identified species are still present in streams in the Jackfork Valley. Similar species have been identified from the Scott site (Bobalik and Galm 1978: 309, Table 38).

An estimate of seasonality based on vertebral growth rings was made (Casteel 1976). Out of 148 vertebral elements, 133 occur during July-October, 9 from March-June, and 6 from November-February. The only evidence as to methods of catching fish are four fishhook fragments and nine pieces of debris relating to fishhook manufacture.

#### *AMPHIBIANS*

A bullfrog and plains spadefoot toad recovered in N28-E2 are the



Table 12. Continued.

Species	10	15	2	4	10	12	1	5	8	1	3	5	8	9	11	17	Total	MNI
<b>MAMMALS:</b>																		
<i>Canis latrans</i> (Coyote)	-	-	-	-	1	-	-	-	-	-	1	-	-	-	1	-	7	6
<i>Canis canadensis</i> (Beaver)	-	-	-	-	-	-	-	1	1	2	-	-	1	-	1	-	14	11
<i>Canis canadensis</i> (Elk)	-	-	-	-	-	-	-	-	-	-	-	1	-	1	-	-	5	5
<i>Didelphis marsupialis</i> (Possum)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	2
<i>Geomys bursarius</i> (Plains pocket gopher)	-	-	-	-	-	2	-	-	1	-	1	4	2	3	1	-	29	21
<i>Lepus californicus</i> (Black-tailed jack rabbit)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1
<i>Odocoileus virginianus</i> (White-tailed deer)	9	1	4	13	23	3	6	2	22	3	16	26	16	10	15	3	544	50
<i>Procyon lotor</i> (Raccoon)	1	-	-	-	2	2	-	-	-	-	1	1	2	-	2	-	26	19
<i>Sciurus niger</i> (Fox squirrel)	1	1	-	2	1	-	-	-	3	-	1	1	1	6	4	-	39	23
<i>Stomodemus hiemalis</i> (Cotton rat)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	2	2
<i>Sylvilagus floridanus</i> (Eastern cottontail)	3	1	1	2	3	2	1	2	1	-	3	5	8	7	4	-	108	46
<i>Urocyon cinereoargenteus</i> (Gray fox)	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	8	5
<i>Vulpes fulvus</i> (Red fox)	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	1	1
<b>BIRDS:</b>																		
<i>Meleagris gallopavo</i> (Turkey)	1	-	-	-	1	-	-	1	2	-	1	-	3	-	1	-	20	13
<b>REPTILES:</b>																		
<i>Chelydra serpentina</i> (Snapping turtle)	5	-	-	-	-	-	-	-	3	-	-	-	-	-	-	-	34	7
<i>Crotalus constrictor</i> (Racer)	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	19	7
<i>Crotalus atrox</i> (W. Diamond Black)	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	3	2
<i>Emydoidea blandingii</i> (Map turtle)	-	-	-	5	-	-	-	-	-	-	-	-	-	-	-	-	49	4
<i>Emydoidea floridana</i> (Yellow mud turtle)	-	-	-	-	-	-	-	-	5	-	-	-	-	-	-	-	12	3
<i>Pseudemys floridana</i> (Missouri slider)	-	-	-	-	6	-	-	-	3	-	-	-	-	-	-	-	60	6
<i>Sternotherus carolinensis</i> (Razorback musk turtle)	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	1	1
<i>Sternotherus odoratus</i> (Stinkpot)	9	-	-	-	-	6	7	23	63	-	-	-	-	-	-	-	575	7
<i>Trionyx carolinensis</i> (Box turtle)	53	-	2	14	13	4	85	56	46	5	12	6	16	3	3	-	1,550	7
<b>FISH:</b>																		
<i>Ambloplites rupestris</i> (Drum)	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	3	2
<i>Ictalurus sp.</i> (Catfish)	-	-	-	-	-	-	-	-	3	-	-	-	-	-	-	-	5	3
Total	82	3	7	37	50	20	99	84	155	9	38	44	53	30	33	3	3,118	240

Table 13. Vertical distribution of faunal remains from N28-E12.

Species	1	2	3	4	5	6	7	Arbitrary 10 cm Levels								Code			
								8	9	10	11	12	13	14	15	16	17	4	Total
MAMMALS																			
<i>Bison bison</i> (Bison)	-	1	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	2	2
<i>Canis latrans</i> (Coyote)	1	1	-	-	-	-	1	-	1	1	-	1	1	-	-	-	-	8	8
<i>Canis amabilis</i> (Weaver)	-	-	-	-	-	-	-	-	3	-	-	2	2	-	-	-	1	8	4
<i>Canis antelope</i> (Elk)	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1
<i>Dicotyles macropus</i> (Opossum)	-	?	1	-	2	-	-	-	-	-	-	2	-	-	-	-	-	7	4
<i>Lepus texianus</i> (Pocket gopher)	-	-	1	2	1	1	16	2	9	4	4	4	-	-	-	-	2	46	18
<i>Lepus sylvaticus</i> (Black-tail rabbit)	-	-	-	-	-	-	-	1	-	-	1	-	-	-	-	-	-	2	2
<i>Nephrolepis pennsylvanicus</i> (Striped skunk)	-	3	9	-	3	-	-	-	2	-	-	-	-	4	1	-	-	22	7
<i>Nasua narica</i> (Wink)	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	1	1
<i>Odocoileus virginianus</i> (White-tailed deer)	31	58	56	44	54	24	52	40	87	39	64	37	12	16	8	5	-	647	32
<i>Procyon lotor</i> (Raccoon)	4	2	-	-	2	2	1	-	3	-	4	4	-	2	-	-	1	25	10
<i>Sorex aquaticus</i> (Hole)	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	2
<i>Taxidea virginica</i> (Fox squirrel)	-	1	2	-	3	1	2	4	4	-	-	5	-	-	1	-	-	23	10
<i>Spermophilus heermanni</i> (Cotton rat)	-	-	-	1	-	-	-	-	1	-	-	-	-	-	-	-	-	2	2
<i>Eutamias floridanus</i> (Eastern cottontail)	-	3	2	1	5	3	6	4	6	3	5	3	1	-	-	-	-	42	14
<i>Vulpes canadensis</i> (Gray fox)	-	-	2	1	-	1	1	1	-	1	3	-	1	-	-	-	-	11	8

Table 13. Continued.

Species	Arbitrary 10 cm Levels																	Code			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	4	Total	Min	
BIRDS																					
<i>Meleagris gallopavo</i> (Turkey)	2	3	3	3	6	1	4	-	5	1	3	1	-	-	1	1	-	-	38	15	
REPTILES																					
<i>Chelydra serpentina</i> (Snapping turtle)	-	4	15	14	12	1	5	6	8	2	15	-	-	-	-	-	-	1	83	11	
<i>Coluber constrictor</i> (Racer)	-	-	1	4	3	-	7	3	2	-	-	1	1	2	1	-	-	1	26	11	
<i>Crotalus horridus</i> (Timber rattlesnake)	-	-	-	-	-	1	1	2	2	-	-	-	-	2	-	-	-	1	9	6	
<i>Chrysemys pictographica</i> (Map turtle)	5	1	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	7	3	
<i>Pseudemys floridana</i> (Missouri slider)	-	3	9	23	34	11	20	6	13	7	7	1	4	-	-	-	-	2	140	14	
<i>Sternotherus odoratus</i> (Stinkpot turtle)	3	6	16	13	23	8	23	18	15	7	10	4	2	4	-	-	-	-	152	21	
<i>Trionyx carolina</i> (Box turtle)	24	70	126	232	250	95	152	120	205	55	65	48	34	15	6	3	2	47	1549	30	
<i>Trionyx</i> sp. (Softshell turtle)	-	-	1	3	-	1	-	-	1	-	-	-	-	1	-	-	-	-	7	5	
FISH																					
<i>Lepisosteus osseus</i> (Alligator gar)	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	2	1	
<i>Ictalurus punctatus</i> (Channel catfish)	-	-	-	-	1	-	3	2	1	-	-	-	-	-	-	-	-	-	7	4	
TOTAL	66	163	245	346	399	150	297	210	369	120	180	110	60	45	21	10	2	76	2869	246	

Table 14. Vertical distribution of faunal remains from N28-E2.

Species	Arbitrary 10 cm Levels																	Code	Total	MNI
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17			
MAMMALS																				
<i>Bison bison</i> (Bison)	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	1	1
<i>Canis latrans</i> (Coyote)	-	2	-	-	2	-	-	-	1	-	-	1	-	-	-	-	-	-	6	4
<i>Castor canadensis</i> (Beaver)	-	-	-	1	-	-	-	-	3	-	-	5	1	-	-	-	-	-	10	4
<i>Cervus canadensis</i> (Elk)	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	2	1
<i>Dicotyles maculata</i> (Opossum)	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	1	1
<i>Geomys bursarius</i> (Pocket gopher)	-	2	7	1	9	4	2	3	10	3	2	6	4	-	-	1	-	-	54	23
<i>Lepus americanus</i> (Black-tail rabbit)	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	2	1
<i>Odocoileus virginianus</i> (White-tailed deer)	10	18	18	44	22	30	22	26	15	31	28	21	21	12	6	5	4	1	334	24
<i>Peromyscus leucopus</i> (Raccoon)	-	-	1	4	-	1	-	-	-	7	-	-	-	1	-	-	-	-	14	5
<i>Sciurus niger</i> (Fox squirrel)	-	2	6	5	7	2	5	1	4	1	6	5	5	1	-	-	-	-	50	17
<i>Spermophilus hispidus</i> (Cotton rat)	-	-	7	1	3	1	1	-	1	4	-	14	2	1	-	-	-	-	35	13
<i>Sylvilagus floridanus</i> (Eastern cottontail)	3	1	5	9	2	5	4	3	3	15	15	12	5	3	-	-	1	-	86	23
<i>Urocyon americanus</i> (Gray fox)	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	1	1
<i>Ursus americanus</i> (Black bear)	-	1	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	3	2
BIRD																				
<i>Meleagris gallopavo</i> (Turkey)	-	-	1	5	2	1	3	1	-	-	3	-	-	1	-	-	-	-	17	9

Table 14. Continued

Species	Arbitrary 10 cm Levels																	Code	Total	MMI
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17			
REPTILES																				
<i>Chelydra serpentina</i> (Snapping turtle)	-	-	-	-	-	2	1	-	-	-	1	4	1	-	-	2	-	-	11	6
<i>Coluber constrictor</i> (Racer)	-	3	4	7	3	8	-	1	4	1	1	1	1	1	-	-	-	-	35	12
<i>Crotalus atrox</i> (W. diamond back)	-	-	2	2	-	-	-	1	1	5	2	1	-	-	-	-	-	-	14	7
<i>Crotaphytus collaris</i> (E. collared lizard)	-	-	-	-	1	-	1	-	-	-	-	-	-	-	-	-	-	-	2	2
<i>Geophis pensilvanicus</i> (Map turtle)	-	-	-	5	-	3	10	-	-	-	-	-	-	-	-	-	-	-	18	3
<i>Pseudemys floridana</i> (Missouri slider)	-	-	-	16	2	-	2	-	-	2	-	-	-	-	-	-	-	-	22	4
<i>Stemmatopus odoratus</i> (Stinkpot turtle)	7	30	46	40	29	25	33	32	20	18	11	8	8	-	3	-	-	-	310	?
<i>Terrapene carolina</i> (Box turtle)	43	64	104	220	130	160	118	31	36	56	31	24	7	3	-	-	-	21	1048	?
AMPHIBIANS																				
<i>Rana catesbeiana</i> (Bullfrog)	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	1	1
<i>Bombina orientalis</i> (Spadefoot toad)	-	-	-	1	1	2	-	-	-	-	-	-	-	-	-	-	-	-	4	3
FISH																				
<i>Aphredonotus grammurus</i> (Drum)	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	1	1
<i>Leiostomus xanthurus</i> (Catfish)	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	1
<i>Leiostomus xanthurus</i> (Gar)	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	1	1
Indeterminate fish	2	5	6	12	11	16	18	21	23	13	3	5	12	-	-	2	-	-	149	?
TOTAL	65	131	207	373	226	262	220	121	121	159	106	108	67	23	9	10	5	22	2235	146

only recognized amphibians from the site. They constitute less than 1% of the sample. Parmalee, Paloumpis, and Wilson (1972: 24) indicate that bullfrogs may be a subsistence item. It is most probable that these individuals occurred at the site naturally.

## REPTILES

### TURTLES

Eight species of turtles are identified, and in terms of raw numbers constitute the majority (68%) of the identifiable faunal elements from the site. However, this number should not be taken as an overall indicator of importance since most of the turtle remains consisted of shell fragments (peripherals, nuchals, and so forth). Minimum number calculations are also hampered by this problem and probably do not reflect the actual importance of these reptiles. Undoubtedly, turtles were an important subsistence item, and several reconstructed or complete shells were charred on the exterior suggesting they were prepared in the shell. Box turtle (*Terrepene ornata*) is the most common (74%) and probably reflects the ease with which they could be collected. The next most common species is the stinkpot (*Sternotherus odoratus*), and accounts for 18% of the sample. The stinkpot as well as the remainder of the species are either aquatic or semiaquatic and are slightly more difficult to obtain. One turtle carapace and plastron are modified. The vast majority are unworked and were probably used as a subsistence item. Turtle remains occur throughout the site, but the greatest numbers are from Levels 6-10 (50-100 cm).

### SNAKES AND LIZARDS

Only one lizard species (Eastern collared lizard) was identified, and probably occurred at the site naturally. The only snakes are rattlesnake and Southern black racer. Both may have been used as food, but their sporadic distribution throughout the site suggests they are natural occurrences.

## BIRDS

The only identified species is *Meleagris gallopavo* (wild turkey) which occurs in most levels of the site. In general, avian fauna is minimal (an estimated 6% of the total amount of faunal remains). However, 10 turkey and 45 unidentifiable bird bones constitute 11% of the modified bone.

## MAMMALS

Sixteen mammal species are identified and represent 27% of the sample. White tail deer (*Odocoileus virginianus*) makes up 68% of the mammals and probably represents the major subsistence resource at the site. Their remains are distributed evenly throughout the site, and several elements exhibit butchering marks. The majority are extremely fractured and long bones are cracked open. This suggest that marrow extraction was common (Vehik 1977). Several of the ground and pecked stone artifact categories may relate to marrow extraction activities. Since there seems to be no preference for certain elements or lack of particular elements, it seems that the entire deer carcass was returned to the site prior to butchering or distribution.

The majority (40%) of the worked bone is also mammal. Deer is again the most common, making up 24% of the total worked bone.

With the exception of elk, bison, and bear, the rest of the mammals occur in the area today. Elk, bison, and bear occurred throughout the project area in historic times before being extirpated by hunting and modern land practices. Table 15 provides the presently favored habitats of the identified species. Woodlands are the preferred habitat of nine species and secondary habitat of four species. Five species prefer prairie environments and four species occupy prairies as a secondary habitat. Riparian habitats are preferred by three species and are secondary habitats of eight species. Finally, the only aquatic species is beaver, but minks also utilize this habitat.

#### INVERTEBRATE REMAINS

##### MOLLUSCS

Twelve species of fresh water mussels have been identified (Table 16). All species are still present in the Kiamichi River and its tributaries (University of Oklahoma 1975: 119-121, Table 9). In addition to 768 identified mussels, there are 6388.5 g of unidentified fragments. Based on the information presented in Table 16, the major type of mussel is *Tritogonia verrucosa* (pistolgrip). It is also evident that the greatest number of naiads occur in Levels 7-10. Twelve fresh water mussels were worked. Six of these were pendants of which one is *Amblema costata* (three-ridge) and two are *Actiononaias carinata* (Mucket). One miscellaneous worked shell is identified as *Tritogonia verrucosa*. The remainder of the mussels are unworked and 600 pieces are burned. The large amounts of mussels from the site suggest they were being relied on as an important subsistence supplement.

White (1977: 103-105) and Bobalik and Galm (1978) have identified similar species from the Scott and Wann sites in the Wister Valley. The primary difference is that they did not identify mucket, Black

Table 15. Habitat preference of modern mammals.

Species	Present Occurrence	Riparian	Woodland	Prairie	Aquatic
Opossum	C	X	-		
Black-tail jackrabbit	O,C			X	
Eastern cottontail	C	-	X	-	
Coyote	C		-	X	
Plains pocket gopher	O,C			X	
Fox squirrel	C	-	X		
Raccoon	C	X	-		
Red fox	O,C		X		
Gray fox	C		X		
Cotton rat	C		X	-	
Elk	R	-	X	-	
Beaver	O,C	-			X
Deer	C	-	X	-	
Striped skunk	C	-	X		
Mink	C	X			-
Mole	C	-	-	X	
Bear	R	-	X		
Bison	R			x	

C = common, O = scattered or local populations, R = rare,  
 X = preferred habitat, and - = secondary habitat.

Table 16. Vertical distribution of identified mollusc remains.

Species	Arbitrary 10 cm Levels																		Total
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	
<i>Actinonaias caninata</i> (Mucket)	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	1
<i>Ambelma oostata</i> (Three-ridge)	-	5	17	20	19	24	48	55	41	34	33	20	9	3	4	1	-	-	333
<i>Fusconia flava</i> (Wabash pigtoe)	-	-	1	3	3	9	10	9	5	4	4	3	-	1	-	-	-	-	52
<i>Lampsilis onodontoidea</i> (Yellow sandshell)	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	2
<i>Lampsilis ovata</i> (Pocket book)	-	-	1	-	4	2	3	-	2	3	4	-	1	-	-	-	-	1	21
<i>Lampsilis radiata</i> (fat mucket)	-	-	-	3	4	8	4	19	7	17	18	6	3	-	-	-	2	-	92
<i>Ligumia recta latissima</i> (Black sandshell)	-	-	-	1	-	5	8	12	18	24	11	2	3	-	1	-	-	-	85
<i>Proptera purpurata</i> (Purple shell)	-	-	1	1	-	-	1	-	4	-	-	-	-	-	-	-	-	-	7
<i>Quadrula pustulosa</i> (Pimple back)	-	1	4	4	10	7	2	5	3	5	3	3	-	-	-	-	-	-	47
<i>Tritogonia verrucosa</i> (Pistolgrrip)	-	1	8	14	10	15	10	12	14	18	11	7	4	1	-	-	-	-	125
<i>Truncilla donatensis</i> (Fawns foot)	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	1
<i>Truncilla truncata</i> (Deer toe)	-	-	-	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	2
Total	-	7	32	47	52	70	87	112	94	107	84	41	20	5	5	1	2	-	768

sandshell, purple shell or fawn's foot. One species missing from the Bug Hill site is warty back mussels.

## GASTROPODS

The gastropod analysis is divided into two parts. The first deals with all gastropods recovered during dry screening through  $\frac{1}{8}$ -inch mesh hardware cloth. The vertical distribution of these is in Table 17 and the horizontal distribution is in Table 18. Also Figure 29 illustrates the percentage of gastropods by vertical depth. It is evident from Table 17 and Figure 29 that the majority of the snails are from Levels 6-11 (50-110 cm) with the greatest amounts in Levels 7-8 (60-80 cm). These levels correspond with the heaviest occupational zones at the site (Strata IIa-IIb). The lack of gastropods in the upper three levels is thought to be due to plowing, addition of chemical fertilizer, and land clearing activities. The decline of snails in the lower levels of the site may be due to soil conditions, particularly increasing soil acidity.

There are some differences in the vertical distribution of gastropods (Figure 29). *Anguispira alternata* are abundant in Level 6 (50-60 cm) and decline proportionately with vertical depth. Most of the rest of the species increase in relative frequency in Level 9 (80-90 cm) or in Level 10 (90-100 cm) and decline in Level 12 (110-120 cm). There is no good explanation for this variation. With the exception of *Triodopsis cragini*, which is resistant to dry conditions (Branson 1962: 72-73), the rest of the terrestrial species occur in relatively moist, wooded areas (Branson 1962, 1963, 1964; Cheatum and Fullington 1971, 1973; Leonard 1959; Allen and Cheatum 1961). A minor environmental change may account for the observed differences, but there is little evidence for this. The most economical explanation is that certain gastropods are better adapted to refuse and the increases in Level 9 may reflect this.

None of the gastropods seem to have been used as food. The few aquatic specimens (*Helisoma trivolvis*) could have been brought to the site attached to aquatic plants or mussel shells (Metcalf 1977). The few marine gastropods (*Marginella* sp) are believed to have been obtained through trade and were used for beads. One bead was made from a terrestrial species (*Succinea* sp).

There is some horizontal variation with 24% of the gastropods occurring in N28-W0, 15% in N24-E10, and 10% in N28-E2. Gastropods (especially *Anguispira alternata*, *Mesodon inflectus*, *Mesomphix friabilis*, and *Zonitoides arboreus*) begin to increase dramatically in Level 6 (50-60 cm) and continue through Level 12 (110-120 cm) in N28-W0. These levels are believed to be disturbed by the interment of a cremation (Feature 79-31, Burial 7). In N24-E10, the same species increase in Levels 6-10 (50-100 cm) which are associated with Features 79-34 (ash/clay concentration) and 79-35 (rock concentration). Several

Table 17. Vertical distribution of gastropods at the Bug Hill site.

Species	Arbitrary 10 cm Levels																	Total
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	
<i>Anguispira alternata</i>	-	1	9	127	400	718	605	537	312	175	145	45	21	6	5	2	1	3109
<i>Neuaxon inflectus</i>	40	2	1	19	68	180	177	195	180	215	205	74	14	12	5	-	-	1387
<i>Mesodon thyroides</i>	-	-	-	3	7	7	-	9	15	15	9	7	8	3	1	-	-	84
<i>Mesomphix friabilis</i>	15	-	1	30	103	153	177	183	146	161	119	38	17	4	1	1	-	1149
<i>Stenotrema leai alliciae</i>	-	-	-	2	18	48	51	91	128	159	156	73	19	10	4	-	-	759
<i>Zonitoides arboreus</i>	3	-	-	4	14	36	44	40	68	56	56	17	1	2	1	-	-	342
<i>Triakoppnis eragini</i>	-	-	-	-	-	-	2	-	3	2	1	1	-	-	-	-	-	9
<i>Helisera trivolvis</i>	-	-	-	-	-	3	1	1	2	3	1	1	-	-	-	-	-	12
<i>Gastrocopta amifera</i>	-	-	-	-	2	1	-	2	1	3	2	-	-	-	-	-	-	11
<i>Olivella sp.</i>	-	-	-	-	-	-	-	2	1	3	-	-	-	-	-	-	-	6
<i>Succinea sp.</i>	-	-	-	1	-	-	-	-	-	1	1	-	-	-	-	-	-	3
Total	58	3	11	186	612	1146	1057	1060	856	793	695	256	80	37	17	3	1	6871

Table 18. Horizontal distribution of gastropods at the Bug Hill site.

Excavation Unit	<i>Anguilepura alternata</i>	<i>Mesodon inflectus</i>	<i>Mesodon thyroides</i>	<i>Mesomphix frabillii</i>	<i>Stenotrema leai aliciae</i>	<i>Zonitoides arboreus</i>	<i>Tritidopsis argenti</i>	<i>Helisoma trivialis</i>	<i>Gastropocopta amifera</i>	<i>Olivella</i> sp.	<i>Succinea</i> sp.	Total	Percentage
N16-W0	1	-	-	1	-	-	-	-	-	-	-	2	-
N30-W8	48	51	-	34	3	7	-	-	-	-	-	143	2%
N28-W0	901	282	10	354	46	64	-	1	3	-	-	1661	24%
N28-E2	322	150	3	117	38	43	-	1	-	-	-	674	10%
N24-E10	509	242	12	166	79	41	-	2	3	-	-	1054	15%
N24-E12	306	115	20	70	106	41	3	2	3	-	1	667	10%
N26-E10	327	150	11	92	79	38	-	2	2	-	1	702	10%
N26-E12	218	103	9	80	77	20	5	-	-	-	1	513	8%
N28-E12	163	81	7	72	85	29	-	-	-	1	-	438	6%
N28-E14	192	90	1	88	122	16	-	1	-	5	-	515	8%
N41-E2	120	121	11	75	124	43	1	3	-	-	-	498	7%
N48-W14	2	-	-	-	-	-	-	-	-	-	-	2	-
N6-W11	-	2	-	-	-	-	-	-	-	-	-	2	-
Total	3109	1387	84	1149	759	342	9	12	11	6	3	6871	100%

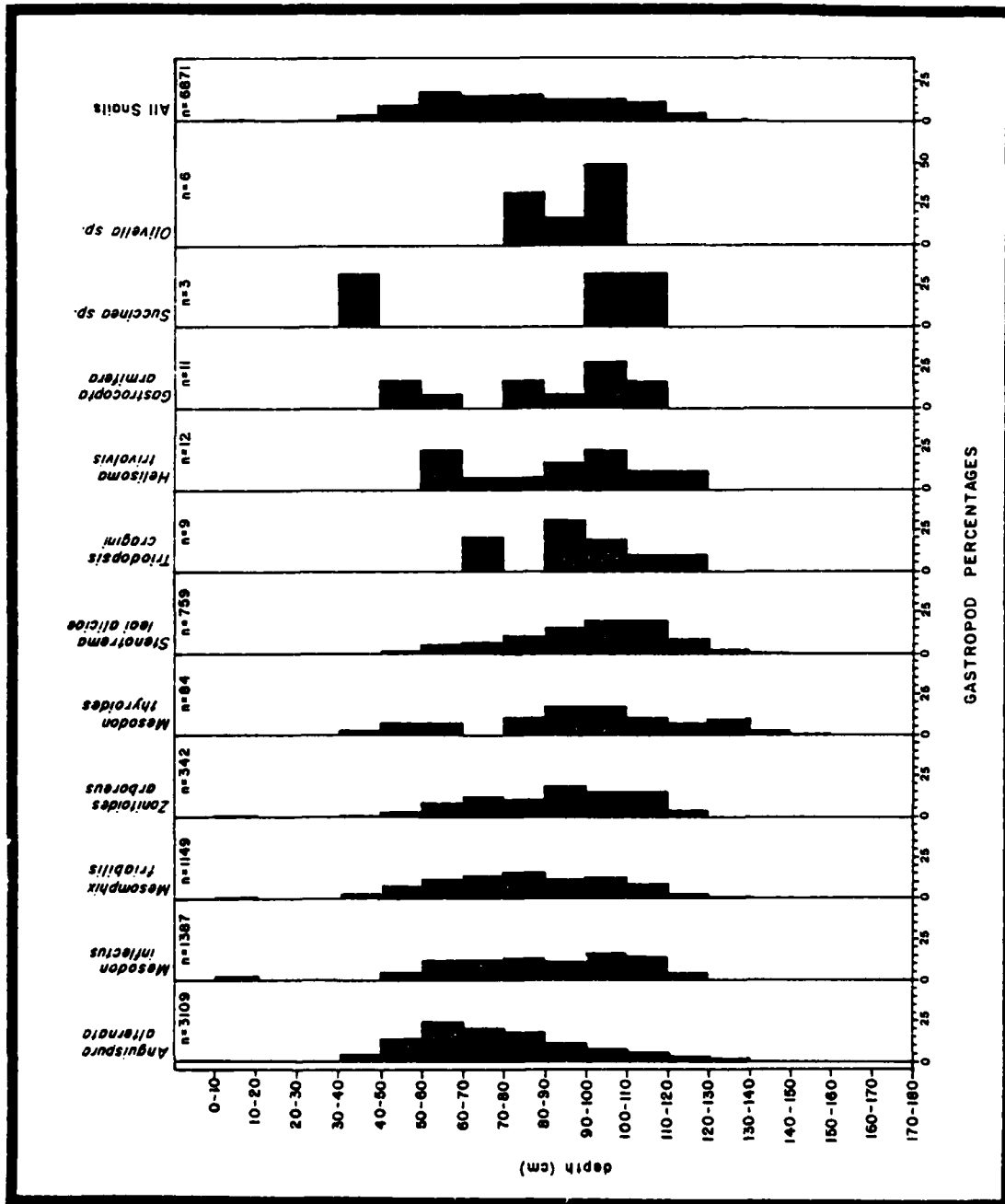


Figure 29. Percentage graph of vertical distribution of gastropods from 34Pu-116.

compact areas of baked clay and ash were noted in levels below the features. The same situation is true in N28-E2 where the increase in gastropods may be associated with Feature 79-7 (an ash/clay concentration and postmolds) at a depth of 40 cm. Gastropod frequencies increase in Levels 5-8 (40-80 cm) in this square.

Another aspect is that the majority of the gastropods occur in the central part of the site. There is a drastic decline in the frequency of gastropods toward the edges of the site, and very few gastropods are present in the edge squares. This may indicate a more concentrated occupation of the center of the site, and the gastropods were attracted to greater amounts of refuse. More likely, the decline is related to preservation, in the sense that soils are more acidic toward the edges of the site.

The second part of the analysis is related to gastropods recovered through waterscreening and flotation. Most of these specimens were not analyzed due to time limitations, funding, and a lack of expertise. It is estimated that over 7000 gastropods were recovered from 34 5 cm levels in the southeast quarter of N28-E2. Out of this number, 2100 gastropods were analyzed and 1033 were identified. These are listed in Table 19. All of these species occur characteristically in wooded, humid, and floodplain environments.

#### FLORAL REMAINS

The predominant floral remains are charcoal and charred nutshell. Seeds are limited and were recovered only from waterscreening and flotation. The vast majority of these are unburned and were probably brought to the site by rodents or occurred naturally. Table 20 provides distributional information of recovered seeds. It is evident that the greatest numbers are unburned and occur in the upper two or three levels (0-30 cm) which are also disturbed by cultivation.

Table 21 provides information about charcoal by weight and Table 22 details the distribution of charred nutshell. It is evident that both classes of material diminish in squares along the edge of the site. Vertically, most of the charcoal occurs in Levels 6-11 (50-110 cm) and charred nutshell occurs in greatest quantities in Levels 4-11 (30-110 cm). Neither class of material has been identified, but it is believed that the charred nutshell is mostly made up of hickory and acorn fragments.

Indirect floral evidence is also available from other classes of artifacts. Basketry impressions are present on several Williams Plain pottery bases and several ceramic decorative motifs were produced by using sharpened or rounded pieces of wood. Also several pieces of baked clay are stick and cane impressed.

Table 19. Distribution of gastropods from three 5 cm levels from the control square, N28-E2.

Species	Level 11 (50-55 cm)	Level 19 (90-95 cm)	Level 22 (105-110 cm)
<i>Anguispira alternata</i>	21	-	-
<i>Gastrocopta armifera</i>	24	135	59
<i>Gastrocopta contracta</i>	7	228	89
<i>Strobulops labyrinthica</i>	3	5	62
<i>Helicodiscus parallelus</i>	11	12	5
<i>Hawaia minuscula</i>	63	112	96
<i>Zonitoides arboreus</i>	5	25	7
<i>Mesodon inflectus</i>	-	2	1
<i>Nesoritrea indentata</i>	-	7	10
<i>Nesovitrea electrina</i>	-	3	-
<i>Carychium exile</i>	-	2	1
<i>Gastrocopta cristata</i>	-	1	-
<i>Gastrocopta pentodon</i>	-	3	1
<i>Vertigo tridentata</i>	-	1	-
<i>Stenotrema leai aliciae</i>	-	-	1
Indeterminate (broken)	259	703	105
Total	393	1239	437

Table 20. Distribution of seeds from waterscreen and flotation analysis.

Excavation Unit/Level	Burned		Unburned		Matrix Sample
	#	wt.	#	wt.	
N48-W14					
2 (10-20 cm)	-	-	27	<0.1	10 Liter Float
3 (20-30 cm)	-	-	19	0.1	10 Liter Float
4 (30-40 cm)	-	-	6	<0.1	10 Liter Float
5 (40-50 cm)	-	-	3	<0.1	10 Liter Float
6 (50-60 cm)	-	-	2	<0.1	10 Liter Float
N27-E44					
1 (0-10 cm)	-	-	-	4.8	10 Liter Float
3 (20-30 cm)	7	<0.1	19	0.1	10 Liter Float
4 (30-40 cm)	9	<0.1	-	-	10 Liter Float
N26-E10					
2 (10-20 cm)	-	-	29	<0.1	10 Liter Float
N28-E2					
1 (0-10 cm)	-	-	3	0.7	5 Liter Float
2 (10-20 cm)	-	-	1	0.4	Waterscreen
3 (20-30 cm)	-	-	-	<0.1	5 Liter Float
4 (30-40 cm)	-	-	-	0.1	5 Liter Float
5 (40-50 cm)	-	-	-	0.4	5 Liter Float
7 (60-70 cm)	1	<0.1	-	-	5 Liter Float
8 (70-80 cm)	-	-	-	0.2	5 Liter Float
9 (80-90 cm)	2	<0.1	-	<0.1	5 Liter Float
11 (100-110 cm)	-	-	-	0.1	5 Liter Float
12 (110-120 cm)	-	-	-	0.1	5 Liter Float
13 (120-130 cm)	4	<0.1	-	<0.1	5 Liter Float
15 (140-150 cm)	-	-	-	<0.1	5 Liter Float
N28-W0					
F79-31	-	-	-	0.3	Burial 7 Matrix
N24-E12					
F79-36	-	-	-	<0.1	Burial 9 Matrix
N26-E12					
F79-38	-	-	-	<0.1	Burial 10 Matrix
N26-E10					
F79-39	-	-	-	<0.1	Burial 11 Matrix
N28-E14					
11 (100-110 cm)	-	-	-	<0.1	F79-23 Matrix

Table 21. Horizontal and vertical distribution of charcoal by weight (in grams).

Excavation Unit	Arbitrary 10cm Levels																		Total	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18		Code 4
M16-W0	0.1	1.5	5.2	3.9	14.5	19.2	26.5	13.0	12.8	3.8	12.7	0.5	-	-	-	-	-	-	1.3	115.0
N28-W0	-	2.9	5.7	7.0	3.3	10.0	7.2	20.1	23.2	8.0	22.9	4.7	0.4	<0.1	0.6	-	-	-	4.7	120.7
N28-E2	2.0	8.6	13.8	14.2	11.0	10.0	18.4	18.8	13.0	15.2	11.9	7.6	10.3	1.6	1.0	2.6	2.4	-	-	162.4
N30-W3	-	2.5	2.9	7.7	11.4	13.1	13.2	19.7	3.5	1.6	1.2	6.2	0.5	1.1	-	-	-	-	0.6	84.6
N24-E10	0.7	3.5	6.5	11.4	0.5	17.2	15.1	8.9	36.0	12.8	18.7	-	11.5	5.3	1.2	-	-	-	-	149.3
N24-E12	0.1	0.8	1.0	8.0	2.1	2.8	7.0	3.8	6.3	9.9	5.7	4.1	3.0	0.7	-	-	-	-	-	55.3
N26-E10	<0.1	1.1	13.4	0.1	0.4	2.3	19.7	5.4	5.6	10.8	35.5	0.3	2.5	2.6	1.4	-	-	-	-	101.1
N26-E12	-	0.1	-	1.1	1.2	3.3	1.7	3.3	3.8	6.2	-	1.4	*	*	*	-	-	-	-	22.1
N28-E12	0.2	-	3.1	2.8	3.4	6.9	6.4	7.6	9.9	1.2	7.7	5.8	1.4	1.1	0.5	0.2	-	0.1	2.4	60.7
N28-E14	-	0.2	-	1.6	6.5	3.8	5.1	2.7	7.1	7.1	5.6	1.8	0.1	0.5	0.2	-	-	-	2.3	44.6
M41-C2	-	2.1	4.2	5.9	13.7	12.1	9.8	8.4	6.2	6.0	4.9	8.4	0.1	<0.1	<0.1	0.4	<0.1	0.1	1.2	83.5
M48-W14	<0.1	0.4	0.1	0.2	-	0.9	8.5	0.3	1.1	-	-	-	-	-	-	-	-	-	-	11.5
N50-E29	0.6	7.3	2.3	6.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	16.5
S1-E21	0.4	1.1	0.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.9
M6-W11	<0.1	0.7	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.7
N27-E44	0.8	1.5	0.5	0.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3.1
M65-W14	<0.1	1.3	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.3
Total	4.9	35.6	59.1	70.5	68.0	101.6	138.6	112.0	128.5	82.6	126.8	40.8	29.8	12.9	4.9	3.2	2.4	0.2	12.5	1034.9

\*Mixed with N26-E10.

Table 22. Horizontal and vertical distribution of charred nutshell by weight (in grams).

Excavation Unit	Arbitrary 10cm Levels																	Code 4	Total
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	
N16-W0	-	1.4	6.9	3.9	5.0	7.9	13.3	14.9	4.8	0.5	-	0.2	-	-	-	-	-	-	58.8
N28-W0	-	0.1	1.6	4.5	10.5	8.0	4.2	2.2	10.6	12.9	7.4	1.8	1.2	1.6	0.5	-	-	4.6	71.7
N28-E2	-	0.3	4.6	12.6	11.4	8.0	7.0	7.8	4.2	4.7	2.3	3.3	3.3	<0.1	0.2	0.4	0.6	-	70.7
N30-W8	0.6	2.6	1.8	5.6	7.9	12.3	11.2	12.0	5.4	2.2	2.4	1.3	0.2	-	-	-	-	<0.1	65.5
N24-E10	-	0.2	6.9	3.1	0.4	4.2	5.7	11.3	9.2	43.6	6.6	1.2	6.3	2.3	-	-	-	-	101.0
N24-E12	-	-	1.8	10.4	5.3	4.5	7.1	4.3	4.3	8.0	7.4	7.0	3.9	2.7	0.1	-	-	-	66.8
N26-E10	-	0.5	2.1	0.4	2.7	1.8	14.4	4.7	12.7	8.2	3.1	0.9	3.5	1.9	1.2	-	-	-	58.1
N26-E12	-	0.3	<0.1	1.4	1.0	2.2	0.4	2.9	6.0	3.5	-	0.8	*	*	*	-	-	-	18.5
N28-E12	-	-	0.6	3.3	2.5	2.6	2.5	3.2	5.1	2.8	6.6	5.2	2.1	2.5	0.9	0.4	0.5	0.6	43.5
N28-E14	-	0.1	0.1	1.4	5.1	4.7	2.9	4.9	5.4	4.6	4.4	1.9	1.0	0.4	0.3	-	-	-	37.2
N41-E2	-	0.9	6.0	5.9	3.1	13.1	17.6	11.4	12.5	14.1	7.2	8.5	3.9	0.5	0.4	<0.1	0.1	0.4	107.6
N48-W14	-	<0.1	-	-	-	2.1	6.8	0.2	0.1	-	-	-	-	-	-	-	-	-	9.2
N50-E29	0.9	0.8	1.3	0.2	0.6	0.6	0.7	0.3	-	-	-	-	-	-	-	-	-	-	5.4
S1-E1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N6-W11	-	-	0.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.3
N27-E44	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N65-W14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	1.5	7.2	34.0	52.7	55.5	72.0	93.8	80.1	80.3	105.1	47.4	32.1	25.4	11.9	3.6	0.8	1.2	1.0	8.7
																			714.3

\* Indicates levels combined with N26-E10.

In summary, the same faunal species occurring in the Jackfork Valley today are present at the Bug Hill site. The faunal evidence suggests that mammals, turtles, and molluscs played an important role in subsistence. White tail deer was the most important mammalian species, and there is no selective preference in terms of the types of elements present. Many large mammal bones were split and cracked which is suggestive of marrow extraction. Box turtle seems to have been the preferred amphibian species. This may relate to the ease with which they can be collected. Stinkpot turtle remains are also common. The bone artifact inventory also reflects faunal utilization. Bone tools made from large carnivores (perhaps mountain lion), large birds (possibly eagles), turkey, smaller birds, bear, beaver, dog/coyote, bobcat, raccoon, rodents, fish, turtle, and deer indicate the importance of these animals for tool manufacture. Even though not many fish remains were identified, the presence of fish bones and fishhooks and manufacturing debris indicate that fishing was a relatively frequent activity.

The amount of unmodified mollusc remains also indicate their use as a subsistence item. Several fresh water mussels are also worked. Marine shell artifacts suggest that the population occupying the Bug Hill site was either in contact with Gulf Coast populations or were trading for these items.

Gastropods were not used for food, but a few were modified into beads. Most are are terrestrial species and suggest an environment similar to present conditions. There are vertical differences of some species, but these cannot be tied to climatic changes. Rather, these differences may relate to the affinity of certain species toward refuse and altered conditions resulting from human occupation of the site.

Floral data is limited and this can be related to preservation factors. Charcoal and charred nutshell (most likely hickory and acorn fragments) are present, but seeds are extremely limited and occur in disturbed sediments in the upper levels of the deposits. Through impressions on ceramic items and baked clay, there is evidence that vegetal resources were used.

#### POLLEN ANALYSIS

A pollen profile was obtained from the central part of the north wall in N28-E12. Three samples from various stratigraphic zones were submitted to Dr. Stephen A. Hall, Department of Geography, North Texas State University. The samples were processed in the following manner: hydrochloric acid, hydrofluoric acid, zinc chloride heavy liquid separation with a specific gravity of 1.965, hydrochloric acid, potassium hydroxide, and acetolysis solution. Two Lycopodium spore tablets (containing  $12,500 \pm 500$  spores) were introduced to each sample.

The results of the analysis are in Table 23, and it is apparent that pollen is absent from each sample. The uppermost sample contained the greatest amount of organic debris which declined with depth.

Table 23. Pollen analysis of sediments from the Bug Hill site (34Pu-116).

Laboratory Number	Surface Depth (cm)	Sediment Processed (g)	Introduced Lycopodium	Observed Lycopodium	Observed Pollen
598	20	17.9	25000 $\pm$ 1000	4	0
599	60	19.1	25000 $\pm$ 1000	11	0
600	130	19.0	25000 $\pm$ 1000	18	0

## VII

### DISCUSSION AND INTERPRETATIONS

The site was excavated in a manner which allowed testing the top, sides, and edges of the accretional mound. The majority of the squares were placed at the top with six squares in the east central portion of the site. One reason for this was that excavations at similar sites in the Wister Valley have shown that block excavations may provide more detailed information (Galm 1978a; 1978b; Galm and Flynn 1978). The side and edge squares were excavated to determine the nature of deposits as well as to test the possibility of large concentrated rock scatters such as those encountered at the Curtis Lake site (Galm 1978b) and Scott site (Galm and Flynn 1978). In addition, three backhoe trenches and four 1 m x 1 m squares were excavated to assist in stratigraphic interpretations and to help determine site boundaries.

One problem hampering horizontal and vertical interpretations is bioturbation. Several categories of artifacts, especially pottery and bone tools, were severely scattered. In several instances, broken pieces of the same bone tools were recovered in either the same square at different depths or in several squares at varying depths. One metapodial awl, broken in three sections, was found in N30-W8, Levels 2, 4, and 6. Portions of a Williams Plain potsherd from the same vessel occurred in Levels 1-3 in N28-E12 and in N30-W8, Level 1.

#### HORIZONTAL AND VERTICAL DISTRIBUTIONS

##### Horizontal Distributions

Excavations were concentrated in the west central and east central portions and the northern edge of the site. Even though distributional bias may occur as a result of these techniques, there is not any apparent horizontal concentration of artifact categories. Only organic remains are either absent or occur in lower frequencies in squares near the site periphery. The lack of organic remains in these areas is not cultural, but is attributable to varying soil conditions such as increasing soil acidity toward the site's edges (Table 2).

The distribution of features indicates some horizontal variation. Table 24 provides a listing of features according to their horizontal and vertical placement. If the site is arbitrarily divided into east

Table 24. Distribution of features at 34Pu-116.

Feature Type and Number	Horizontal Provenience	Vertical Provenience	Stratigraphic Relationship
<i>POSTMOLDS</i>			
79-5	N28-E12	84 cm	IIB
79-10	N28-12	110 cm	IIB-III
79-14	N28-E2	120 cm	III
79-23	N28-E14	100 cm	IIB
79-25	N28-E14	120 cm	IIB
79-28	N28-E14	130 cm	III
79-29	N28-E14	150 cm	III
79-37	N26-E10	84 cm	IIA-IIB
79-42	N26-E12	110 cm	IIB-III
<i>ROCK CONCENTRATIONS</i>			
79-1	N30-W8	25 cm	I
79-3	N16-W0	21 cm	I
79-13	N16-W0	70 cm	IIB
79-20	N41-E2	146 cm	IV
79-30	N50-E29	30 cm	I
79-32	N26-E12	25 cm	I
79-35	N24-E10	60 cm	IIA
<i>PITS</i>			
79-12	N28-E2	80 cm	IIB
79-18	N28-E12	108 cm	III
<i>ASH/CLAY CONCENTRATIONS</i>			
79-2	N28-E12	61 cm	IIB
79-6 <sup>1</sup>	N30-W8	60 cm	III
79-7 <sup>1</sup>	N28-E2	40 cm	IIA
79-11 <sup>1</sup>	N28-E2	80 cm	IIA-IIB
79-15 <sup>1</sup>	N41-E2	80 cm	IIB
79-17	N28-E14	74-80 cm	IIA-IIB
79-21	N28-W0	59 cm	IIA
79-26 (hearth)	N28-E14	120 cm	IIB
79-27	N28-W0	100 cm	IIB
79-34	N24-E10/ N24-E12	54-68 cm	IIA
79-40	N26-E12	93 cm	IIB
79-41	N24-E12	101-107 cm	IIB

Table 24 Continued

Feature Type and Number	Horizontal Provenience	Vertical Provenience	Stratigraphic Relationship
<i>BURIALS</i>			
79-4	N28-E12	70-74 cm	IIA
79-8	N28-E12	74 cm	IIB
79-16	N16-W0	92 cm	IV
79-19	N28-E14	67 cm	IIA
79-22	N28-E14	77 cm	IIB
79-24	N28-E14	97 cm	IIB
79-31	N28-W0	110 cm	IIB-III
79-33	N24-E12	46 cm	IIA
79-36	N24-E12	65 cm	IIA
79-38	N26-E12	87 cm	IIB
79-39	N26-E10	91 cm	IIB

and west areas along the E-2 base line, it becomes apparent that 66% of the features occur in the east central part of the site. This is particularly true of postmolds and burials, but four of the seven rock concentrations are in the west central part. This may be the result of excavation bias since seven 2 m x 2 m squares were excavated in the east part of the site.

Burials are concentrated toward the east central part of the site. These are mainly flexed burials and mostly children are represented. Burial pits, in most instances, could not be discerned.

Two burials are in the west central part (N28-W0 and N16-W0). Burial 7 (N28-W0) represents an adult cremation which is secondarily deposited. Burial 4 is a young individual definitely associated with a burial pit. These are two of the deepest burials, but their points of origin may be higher.

The separation of burials may be due to a lack of excavation in areas between N26-E10 and N28-E2. It is apparent that other interments are present since several partial burials (1, 2, 4, and 6) extend into the north, east, west, and southeast walls of their respective squares. Burials, in general, occur above ash/clay concentrations, pits, and postmolds, especially in the east central part of the site.

Rock concentrations are diversely spread across the site. The majority are less than 30 cm deep, and are associated with Stratum I. The deepest rock concentration is at 146 cm. Feature 79-13, at a depth of 70 cm in N16-W0, and Feature 79-35, at a depth of 60 cm in N24-E10, may relate to occupational surfaces defined in these areas of the site. Rock features above 30 cm are believed to relate to early Caddoan occupations. These are illustrated in Figure 30. With the exception of Features 79-13, 79-30, and 79-35, these concentrations are small and at most consist of several clusters of rocks. They are made up of angular cracked sandstone which in some cases is thermally altered. Associated artifacts and those in surrounding matrices are either generalized processing tools or debitage. It is believed these features represent cooking or processing activities.

Features which relate more directly to occupational surfaces are ash/clay concentrations, postmolds, and possible pits. These occurred in almost every excavation unit, but the majority are in the east central part of the site. As indicated in Table 24, six ash/clay concentrations, four postmolds, and a pit are in the west central part of the site. Four ash/clay concentrations have associated postmolds, and one of these (F79-6) is along the western slope of the mound in N30-W8. The depth of these features ranges from 40 cm to 100 cm. It is suggested that Feature 79-7 in N28-E2 is a separate area of high intensity occupation. Features 79-6, 79-11, 79-15, 79-21, and 79-12 which occur between 60-80 cm in this area may relate to a single occupational surface (Figure 31). The levels in which these features occur are characterized by

### 34Pu-II6. DISTRIBUTION OF SELECTED ROCK CONCENTRATIONS.

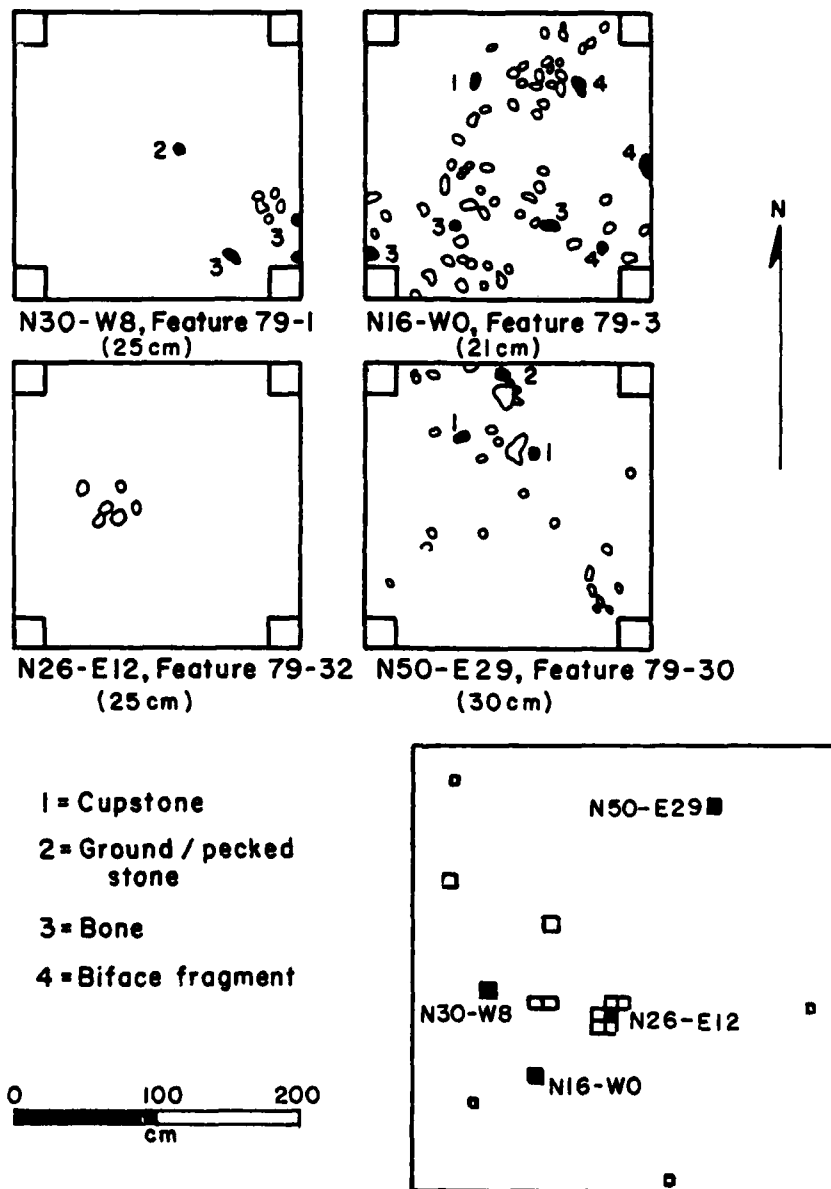


Figure 30. Distribution of rock concentrations.

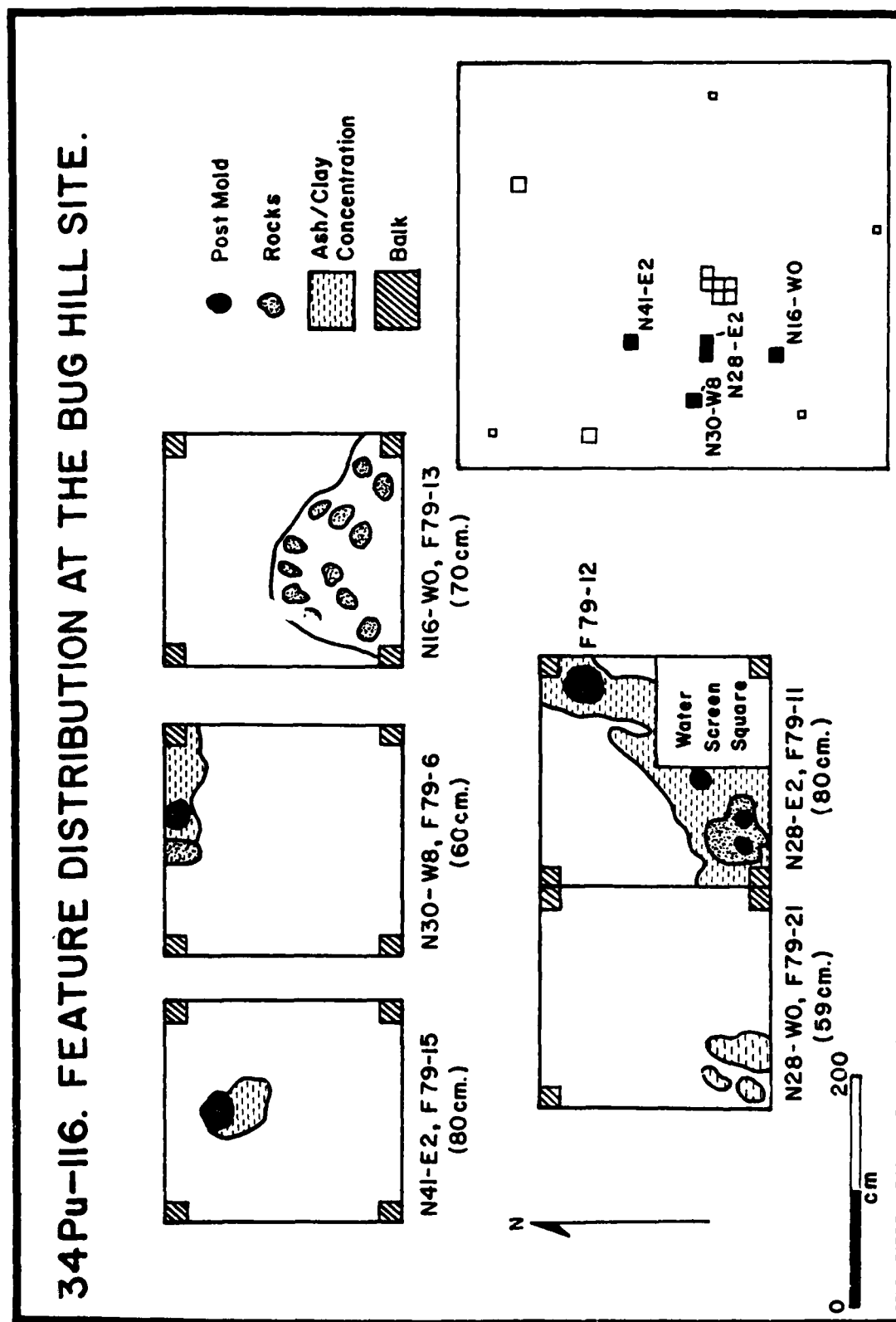


Figure 31. Distribution of features in the west part of the site.

more compact soil, charcoal flecks, and baked clay pieces. A rock feature (F79-13) may also be part of this occupational surface. The postmolds encountered at a depth of 120 cm in N28-E2 (F79-14) and ash/clay concentrations at 100 cm in N28-W0 relate to different activity loci.

Almost every level above 110 cm in the contiguous block in the east part of the site contains baked clay and charcoal. These are scattered amounts, but in Level 5 (40-50 cm) the baked clay and ash become more consolidated in clusters. The majority of the ash/clay concentrations occur below this level, and are believed to relate to occupational surfaces. Even though several features are relatively deep, an examination of the field records indicates that ash/clay clumps may have occurred higher than the depth at which the feature is recorded. An example of this is Feature 79-40 recorded at a depth of 93 cm in N26-E12, but small clumps of ash/clay were noted in Level 9 (80-90 cm) in the same portion of the square and some clumps were observed as high as Level 6 (50-60 cm) in the west half of the square. Ash/clay was also noted in Level 11 (100-110 cm) of this square, and this is believed to be a continuation of the feature. The same situation is true for other features such as burials and postmolds.

Taking these problems into consideration, several occupational surfaces may be associated with features in the east-central part of the site. Ash/clay concentrations (Features 79-2, 79-17, 79-34, and 79-40), postmolds (Features 79-5 and 79-37), and a rock concentration (Feature 79-35) may relate to an occupational zone between 50 cm and 95 cm (Figure 32).

The distribution of postmolds (Features 79-10, 79-25, 79-27, 79-28, and 79-42) and a possible fire hearth (Feature 79-26) are below 100 cm (Figure 33). A pit-like feature (79-18) was noted in an excavation wall of N28-E12 and may be associated. It is possible these features occurred higher, but they were not discerned because of the dark deposits.

A solitary postmold (Feature 79-29) was defined at a depth of 150 cm. Its association with the other features is unknown.

As indicated earlier, artifacts are well distributed across the site and there are no particular clusters associated with single or combined features. The only well associated artifacts are those found with burials. Burial 7 (F79-31) has several calcined canine pendants intermixed with the cremated human remains, and several bone tools which were placed with the cremation when it was interred. Burial 3 (F79-19) has marine and fresh water shell gorgets associated with it. Burial 10 (F79-38) has three bone beads intermixed with the human remains and two biface fragments, a pitted stone, and a mano fragment were in the matrix surrounding the burial.

### 34Pu-116. DISTRIBUTION OF SELECTED FEATURES BETWEEN 50-100cm.

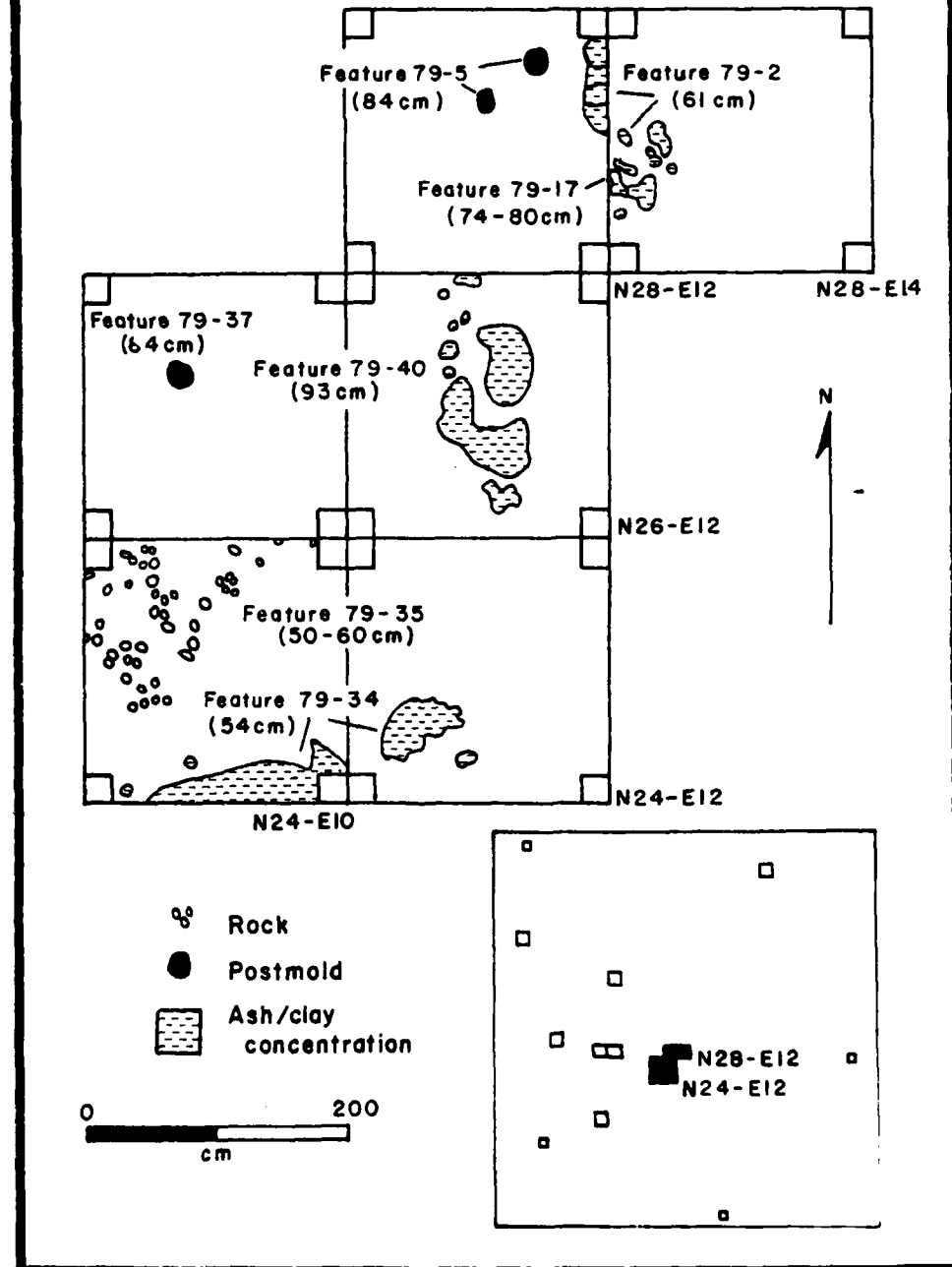


Figure 32. Feature distribution between 50-100cm part of the site.

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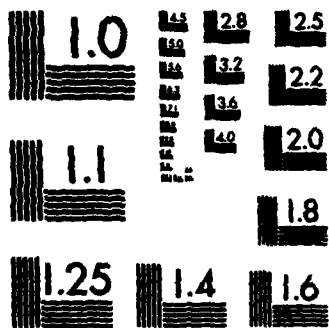
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82 DACH56-78-C-0212 F/G 5/6

373

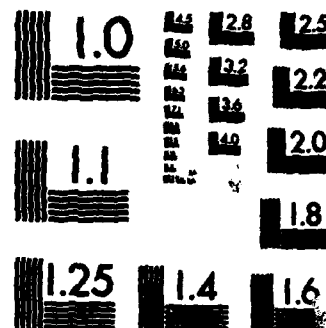
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END

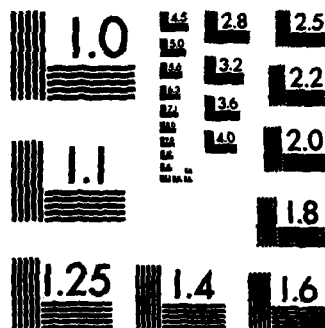
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- 9  
DTIC



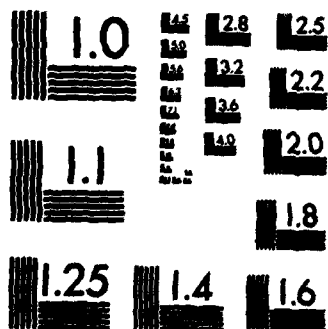
MICROCOPY RESOLUTION TEST CHART  
NATIONAL BUREAU OF STANDARDS-1963-A



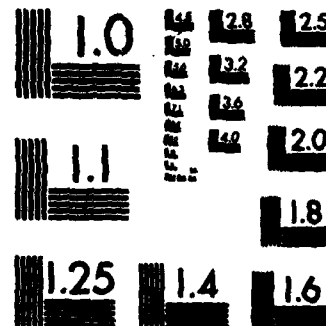
MICROCOPY RESOLUTION TEST CHART  
NATIONAL BUREAU OF STANDARDS-1963-A



MICROCOPY RESOLUTION TEST CHART  
NATIONAL BUREAU OF STANDARDS-1963-A



MICROCOPY RESOLUTION TEST CHART  
NATIONAL BUREAU OF STANDARDS-1963-A



MICROCOPY RESOLUTION TEST CHART  
NATIONAL BUREAU OF STANDARDS-1963-A

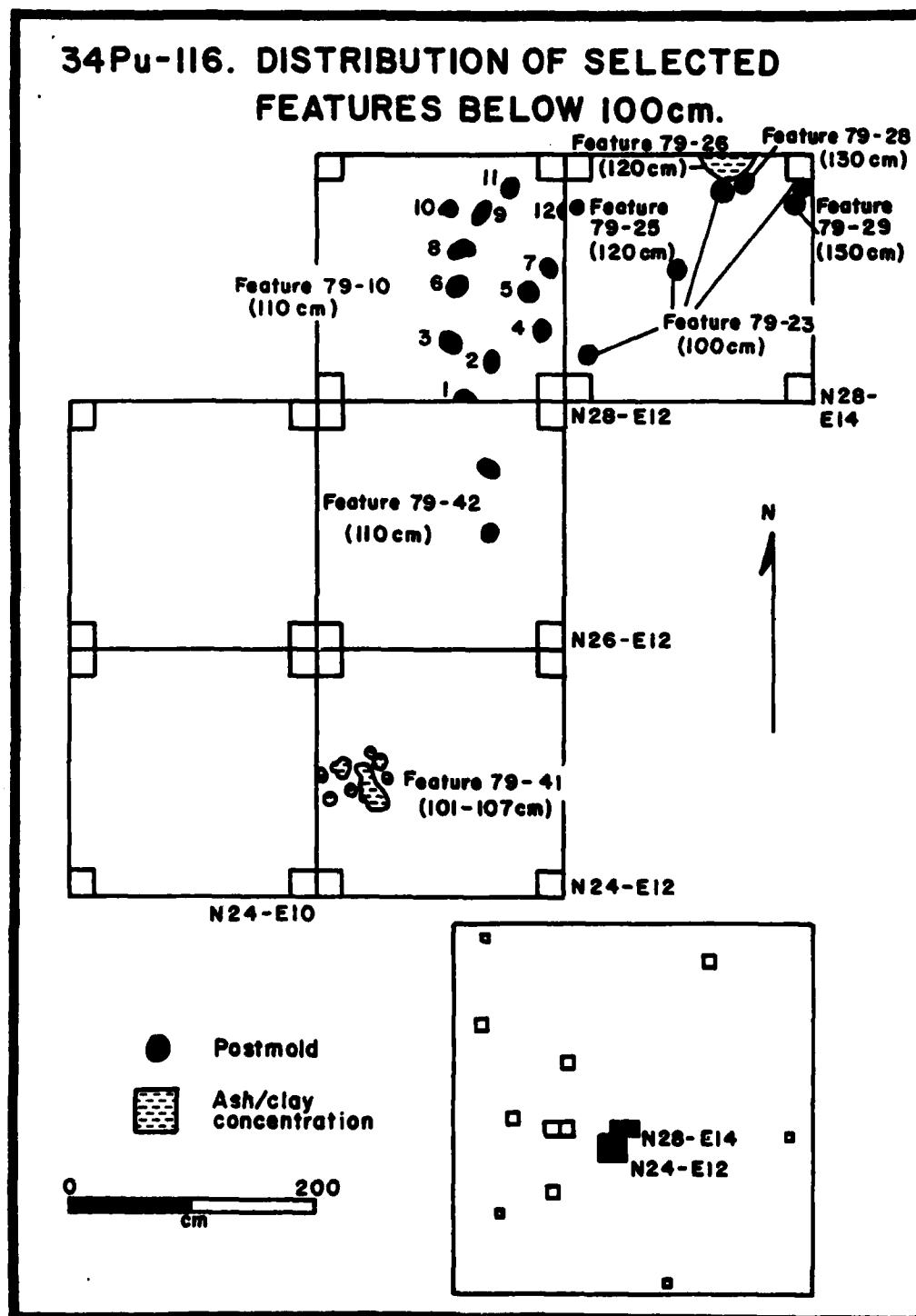


Figure 33. Feature distribution below 100 cm in the east part of the site.

## Vertical Distribution

There are apparent differences in the vertical distribution of artifacts (Tables 24-26). Over 65% of the large contracting stemmed points and 50% of the large straight stemmed points occur in Levels 1-5 (0-50 cm). Most of the small point categories are also confined to these levels. Two small points in Level 7 (60-70 cm) and Level 11 (100-110 cm) are the result of bioturbation. Other major classes of chipped stone such as drills, scrapers, double-bitted axes, bifaces, split and tested cobbles, and modified flakes are more common in the upper five levels. Ceramics and ground/pecked stone categories are also common in these levels. Bioturbation accounts for ceramics below Level 5. Pitted stones are almost evenly divided between the upper five levels and levels below 50 cm. Predominant bone tools in the first five levels are miscellaneous bone flakers, beamers, and spatulates. Finally, historic remains are confined to the upper levels. Two metal fragments found in Level 15 (140-150 cm) are either the result of bioturbation or they were accidentally displaced from a higher level.

Items commonly occurring below Level 5 (40-50 cm) include large expanding stemmed/corner-notched points (64%), pitted stones, modified hematite, a copper tube, fishhooks and fishhook debris, a decorated deer ulna, bone beads, worked rodent teeth, cut bone, miscellaneous worked bone, and most of the antler and shell artifacts.

Faunal remains are fairly consistent throughout the site. There are slight variations in certain species, and a noticeable decline in numbers after Level 10 (90-100 cm). The decline is attributable to preservation. However, molluscs increase in numbers below Level 5. The same is true for charcoal and charred nutshell weights. These items decline in quantity below Levels 10 and 11 (90-110 cm).

Variation in the vertical distribution of gastropods is intriguing, but difficult to explain. *Anguispira alternata* decline in intensity after Level 7 (60-70 cm). Habitats, consisting of moist, wooded conditions, are similar for all species identified. This implies that the variation is not attributable to environmental change. An economical alternative is that the change results from certain species being more attracted to refuse.

## CHRONOLOGY OF SITE OCCUPATIONS

One of the major goals of the research design was to develop a localized chronological sequence at the Bug Hill site and to ascertain the similarity of cultural components between this site and other sites, especially those situated along Fourche Moline Creek in LeFlore County. Additionally, we were interested in obtaining chronological





Table 25. Continued

Artifact Category	Code	Arbitrary 10 cm Levels																		Code			
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	4	Total		
HOES																							
37	-	-	-	-	1	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	2	
BIFACES																							
38 Cobble/Quarried Block Biface I	-	8	4	5	6	3	1	2	3	1	2	2	-	1	1	-	-	-	-	-	1	40	
39 Cobble/Block Biface II/Thick Biface	5	15	29	20	13	9	13	9	6	6	5	8	5	1	1	4	-	-	-	1	9	159	
40 Thin Biface I	1	13	11	9	10	10	9	11	2	5	5	3	5	2	-	2	1	-	-	-	3	102	
41 Thin Biface IIa	-	8	10	12	11	8	8	10	9	6	5	2	3	1	1	-	-	-	-	-	2	96	
42 Thin Biface IIb	-	4	8	5	6	5	4	4	1	4	-	1	1	1	1	1	-	-	-	-	1	47	
POINT/BIFACE FRAGMENTS																							
43	7	240	283	190	169	146	102	118	108	71	64	61	44	35	22	11	4	4	4	6	20	1705	
MODIFIED FLAKES																							
44 Projections	-	7	5	5	4	-	2	2	1	5	2	1	-	3	1	-	1	-	-	-	1	40	
45 Edge altered Flakes	5	296	367	205	204	169	163	145	157	129	96	116	70	53	42	36	22	12	3	27	2317		
46 Denticulates	-	9	2	2	2	1	1	2	3	3	4	1	-	-	-	1	-	-	-	2	33		
CORES																							
47	-	-	2	1	-	1	-	1	-	-	-	-	-	-	-	-	-	-	-	-	5		
SPLIT/TESTED COBBLES																							
48 Split Cobbles	-	2	3	4	3	1	1	1	1	-	-	2	-	1	-	-	-	1	-	-	-	20	
49 Tested Cobbles	1	6	5	7	6	2	3	4	1	1	1	2	3	-	-	-	-	-	-	3	45		
TOTAL	25	667	793	500	484	394	329	336	308	248	204	211	142	106	74	58	30	19	11	78	5017		



Table 26. Continued.

Artifact Category	Code 5	Arbitrary 10 cm Levels										Code										
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Total
55 Plain shale tempered Variety L	-	3	5	2	3	4	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	19
56 Decorated grit, grog, and shale tempered Variety M (Denver Pinchard)	-	-	4	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5
Variety N	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
CERAMIC PIPE	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
57	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
CERAMIC BEAD	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
58	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
GROUND STONE																						
62 Unifacial Manos	2	-	2	2	2	4	2	2	1	-	-	2	1	-	-	-	-	-	-	2	22	
63 Bifacial Manos	2	3	1	3	1	3	1	3	1	-	-	2	1	-	-	-	-	-	-	1	22	
64 Pitted Manos	1	2	1	-	2	2	1	-	-	-	1	1	-	-	-	-	-	-	-	3	14	
65 Metate/grinding stone	-	-	-	3	1	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	5	
66 Celts	-	-	-	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	
67 Boatstone	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	
68 Miscellaneous ground specular sandstone	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	
69 Modified hematite-	-	2	3	1	-	1	6	-	-	1	1	1	-	-	1	-	1	-	1	1	20	

Table 26. Continued.

Artifact Category	Code 5	Arbitrary 10 cm Levels																Code			
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	4	Total
70 Gorgets	-	-	1	1	-	-	-	-	1	-	1	-	-	-	-	-	-	-	-	-	4
71 Ground/Polished Sandstone and shale	-	2	-	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4
72 Miscellaneous ground sandstone/slate	-	2	1	1	2	2	1	-	2	4	1	-	-	-	-	-	-	-	-	-	16
73 Pitted stones	3	-	2	4	4	5	1	8	2	3	2	3	-	1	-	1	-	-	-	2	41
74 Miscellaneous Pecked	-	2	-	3	2	-	1	2	-	1	1	1	-	-	-	-	-	-	-	1	14
COPPER																					
77 Copper tube	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	1
TOTAL																					
10	132	163	86	37	26	16	15	8	9	7	12	2	1	1	1	1	1	-	1	10	539

Table 27. Vertical distribution of selected worked bone, shell, and historic artifacts from 34Pu-116.

Artifact Category	Code 5	Arbitrary 10 cm Levels																		Code			
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	4	Total		
WORKED BONE																							
78 Metapodial awls	-	1	1	-	-	2	1	3	1	2	2	1	1	-	-	-	-	-	-	-	1	16	
79 Splinter awls	-	-	-	1	2	1	1	1	-	1	2	-	-	-	1	-	-	-	-	-	-	10	
80 Pins	-	-	2	-	-	-	-	1	-	-	-	-	1	-	-	-	-	-	-	-	-	4	
81 Awl/pin fragments	-	6	6	8	6	7	6	3	8	3	3	4	2	1	-	1	-	-	-	-	1	65	
82 Ulna flakers	-	-	-	-	-	1	-	-	1	-	-	1	-	-	-	-	-	-	-	-	3		
83 Miscellaneous Bone flakers	-	-	-	1	1	2	-	1	1	-	-	1	-	-	-	-	-	-	-	-	7		
84-85 Fishhook and debris	-	1	-	1	-	-	1	-	-	5	2	3	-	-	-	-	-	-	-	-	-	13	
86 Beavers	-	2	-	2	2	1	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	8	
87 Spatulates	-	1	3	-	2	3	-	2	2	1	1	1	1	-	-	-	-	-	-	-	-	18	
88 Split metapodia	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	1		
89 Bone tubes	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	3		
90 Decorated ulna	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	1		
91 Beads	-	-	-	-	-	-	-	-	1	2	1	-	1	-	-	-	-	-	-	4	9		
92-93 Pendants	-	-	-	-	-	-	2	-	-	1	-	-	-	2	-	-	-	-	-	2	7		
94 Worked rodent teeth	-	-	-	-	-	-	1	2	2	-	1	-	-	-	-	1	-	-	-	-	7		
95 Engraved bone	-	-	-	1	1	-	-	-	-	1	1	1	-	-	-	-	-	-	-	1	6		
96 Cut bone	-	-	-	1	3	1	2	1	1	1	2	-	-	-	-	-	-	-	-	-	12		
98 Miscellaneous Worked bone	-	8	18	13	31	12	25	16	34	18	20	11	11	9	-	4	1	-	-	8	239		

Table 27. Continued.

Artifact Category	Code 5	Arbitrary 10 cm Levels																Code 4	Total		
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16			17	18
ANTLER																					
99 Billets	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	2	3
100 Flakers	2	5	5	5	3	6	5	2	6	4	4	-	-	-	-	-	-	-	-	1	54
101 Handles	-	-	-	-	1	-	-	2	-	-	-	-	-	1	-	-	-	-	-	-	4
102 Miscellaneous Worked antler	-	-	-	1	4	1	2	3	1	3	2	2	-	-	-	-	-	-	-	2	21
WORKED SHELL																					
103 Marine shell pendants	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	2
104 Marine shell beads	-	-	-	-	1	-	-	1	5	4	-	-	-	-	-	-	-	-	-	-	11
105 Miscellaneous worked marine shell	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	1
106 Freshwater shell pendants	-	-	-	-	-	1	1	2	-	-	-	-	-	-	-	-	-	-	-	1	5
107 Freshwater beads	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
108 Miscellaneous worked freshwater shell	-	-	-	-	1	-	-	1	-	-	2	1	1	-	-	-	-	-	-	-	6
HISTORIC																					
109-131	-	56	47	3	1	-	-	-	-	-	-	-	-	-	2	-	-	-	-	1	110
TOTAL																					
2	80	82	37	56	40	49	38	63	47	47	32	21	13	2	8	1	-	-	-	28	647

information between A.D. 1 and A.D. 600 to determine whether a hiatus occurs during this time span. Based on the vertical distribution of cultural remains and the radiocarbon chronology, several occupations can be posited which are related to cultural phases in eastern Oklahoma.

#### WISTER PHASE OCCUPATIONS

At least one preceramic component is suggested for materials found in Levels 6-18 (50-180 cm). This correlates with the bottom of Stratum II, is concentrated in Stratum IIb, and terminates in Strata III and IV. Radiocarbon determinations suggest a range of ten dates beginning as early as  $1605 \pm 125$  B.C. (120-130 cm) and extending to  $298 \pm 60$  B.C. (50-60 cm). There are 50 cm of deposits beneath the earliest determination which are not dated. The dates for the most part are consistent even though a date of  $36 \pm 80$  B.C. (Beta-1413) and a date of  $1055 \pm 75$  B.C. (Beta-1421) may be contaminated. Problems with the 36 B.C. date were discussed earlier. The latter determination is from Level 12 (110-120 cm) in N41-E2. This level is disturbed by roots and other forms of krotovina, and the date is too recent for its stratigraphic placement. Another date for this level, obtained from N28-E2, is  $1446 \pm 90$  B.C. (Beta-1419). This is consistent in its stratigraphic placement. A date of  $457 \pm 95$  B.C. (Beta-1425) from Level 5 (40-50 cm) in N30-W8 is too early for its stratigraphic placement, and the sample is also believed to be contaminated.

There is a break in the radiocarbon sequence between Levels 9 (80-90 cm) and 11 (90-110 cm). Level 9 dates at  $993 \pm 75$  B.C. (Beta-1416) and Level 11 at  $1410 \pm 70$  B.C. (Beta-1417). There is no reasonable explanation since artifact assemblages do not vary greatly, and dates from similar sites in the Wister Valley do not reveal this break. The most economical explanation for this 417 year gap is that it reflects sampling error or that we cannot reliably discriminate between two prehistoric components.

Small points and ceramic categories are virtually absent in this component, and the solitary specimens that occur are the result of some kind of disturbance. Large contracting stemmed points (Category 1) are present, but they are not as frequent as in the upper levels of the site. Large expanding stemmed/corner-notched categories predominate in this component. The major categories are Summerfield (Category 6) and Marshall (Category 18) points. Categories 2, 5, 7, 12, and 17 are also common. Large straight stemmed point categories are infrequent and single specimens of Categories 19, 20, 22, and 23 are present. Category 24 is confined strictly to this component. Drills (Categories 32-34) are infrequent, but scrapers (Category 35) are more common. A single hoe fragment (Category 37) also is present. All of the bifaces (Categories 38-43), modified flakes (Categories 44-46), one core (Category 47), and split and tested cobbles (Categories 48-49) are present, but not as abundant as in the upper levels of the site.

Ground and pecked stone categories include manos (Categories 62-64), modified hematite (Category 69), ground sandstone/slate fragments (Category 72), pitted stones (Category 73), and miscellaneous pecked stone (Category 74). An unusual item associated with this component is a copper tube (Category 77) in Level 6 (50-60 cm).

Bone and shell artifacts are also common. Bone tool categories include awls and pins (Categories 78-81), flakers (Categories 82-83), fishhooks and debris (Categories 84-85), one beamer (Category 86), spatulates (Category 87), a split metapodial (Category 88), engraved and cut bone (Categories 95-96), and miscellaneous worked bone (Category 98). A decorated ulna (Category 90), bone beads (Category 91), canine and incisor pendants (Categories 92-93), and worked rodent teeth (Category 95) are confined to only this component. Antler billets (Category 99), flakers (Category 100), handles (Category 101), and various worked antler fragments (Category 102) are also common. The majority of the shell artifacts, especially Categories 105-107, occur in this component. Items such as marine shell pendants (Category 103), beads (Category 104), and miscellaneous worked fresh water shell (Category 108) also occur in the Fourche Maline component.

Unmodified faunal and floral remains are not as common in these levels, but generally the same species as occur later are represented. Molluscs are very common and probably represent a major dietary supplement in addition to mammalian species, especially deer (which is the major species throughout the occupational history of the site).

The majority of features are associated with this component, and most of the burials occur in these levels. As indicated earlier, the placement of the burials may have occurred at higher levels and cross-cut these levels. Radiocarbon dates from two burials, Feature 79-16 (Burial 4) and Feature 79-31 (Burial 7) may reflect the age of their interment, and would definitely be associated with this component. Burial 4 has a radiocarbon date of  $880 \pm 70$  B.C. (Beta-1422) and Burial 7 is dated at  $288 \pm 70$  B.C. (Beta-1424).

The large amount of ash/clay concentrations, pits, and postmolds suggest a relatively intensive occupation. Several occupational surfaces are defined. One occurs between 60-80 cm in the west central part of the site and the others are in the east central part. One of these is between 50-95 cm and another one appears to be below 100 cm. The latter is associated with the greatest number of postmolds, but no distinct pattern is observable.

This component, dating between  $1605 \pm 125$  B.C. and  $298 \pm 60$  B.C., is very similar to the Wister phase. The Wister phase is defined from sites in the Wister Valley where it is dated between 1500 B.C. and 200 B.C. (Galm 1978a; 1978b; Galm and Flynn 1978; Bell 1980a). Similar dates are reported from the McCutchan-McLaughlin site (Wyckoff 1976; Wyckoff and Woody (1977)). In the Jackfork Valley, radiocarbon dates of

1284  $\pm$ 60 B.C. and 1727  $\pm$ 70 B.C. from the Wheeler Lee site (34Pu-102) suggest a Wister phase date (Lintz 1982).

#### *FOURCHE MALINE PHASE OCCUPATIONS*

A second prehistoric occupation is correlated with the upper part of Stratum IIa in Levels 3-5 (20-50 cm). It is associated with the earliest occurrence of ceramics at the site, and ranges between A.D. 270  $\pm$ 70 and A.D. 617  $\pm$ 80. An earlier date of 36  $\pm$ 80 B.C. (Beta-1413) may also be associated but due to stratigraphic problems it appears to be out of sequence.

Several ceramic varieties (E, H, I, K, and N) in Level 3 (20-30 cm) occur in low amounts and may be the result of bioturbation or an inability to segregate components in Level 3. Williams Plain (Varieties A-B), LeFlore Plain (Variety C), and plain shale tempered ceramics (Variety L) can definitely be placed in this component. Similar ceramics, especially Williams Plain, are the earliest ceramics in eastern Oklahoma (Irvine 1980; Galm 1978a; 1978b; Galm and Flynn 1978).

Associated chipped stone artifacts include large contracting stemmed points (Category 1), most expanding stemmed/corner-notched points (Categories 2, 4, 5, 6, 7, 8, 9, 11, 12, 13, 15, and 17), large straight stemmed points (Categories 18, 19, 21, and 22), and small expanding stemmed/corner-notched points (Category 25). Other small point categories in these levels are attributed to bioturbation. Other lithic categories are drills (Categories 32-34), scrapers (Category 35), a double-bitted axe (Category 38), a hoe (Category 39), all kinds of bifaces (Categories 38-43), modified flakes (Categories 44-46), cores (Category 47), and split and tested cobbles (Categories 48-49). Ground stone categories occur in the greatest frequencies in levels 3-5. All kinds of manos (Categories 62-64) and metates/grinding slabs (Category 65) are common. Other items include celts (Category 66), a boatstone (Category 67), modified hematite (Category 69), gorgets (Category 70), ground and polished sandstone/slate (Categories 71-72), pitted stones (Category 73), and miscellaneous pecked stone (Category 74).

Worked bone, especially utilitarian objects, is common. These include awls (Categories 78, 79, and 81), flakers (Categories 82-83), one fishhook and/or debris (Categories 84-85), beamers (Category 86), spatulates (Category 87), engraved and cut bone (Categories 95-96) and antler tools such as flakers (Category 100, handles (Category 101), one marine shell bead (Category 104), and a miscellaneous worked fresh water shell fragment (Category 108) are also associated.

Differences in the faunal and floral remains associated with Levels 3-5 are difficult to distinguish. The amount of charred nut-shell, charcoal, and mussels increase, but this may be due to better preservation in addition to reflecting occupational intensity.

Rock concentrations may be associated with this occupation. In addition, an ash/clay concentration with an associated postmold (Feature 79-7) and at least one burial (Feature 79-33, Burial 8) is related to this occupation. The burial could have originated in a higher level, but it is difficult to determine this.

The radiocarbon dates of A.D. 278 and A.D. 617 and associated cultural remains strongly argue for a Fourche Maline phase placement (Galm 1978b; Galm and Flynn 1978; Bell 1980a). The Fourche Maline phase is based on investigations in the Wister Valley and is dated as early as A.D. 1 and extends to A.D. 800-1000 (Galm and Flynn 1978: 156).

At several sites (Curtis Lake, Scott, Troy Adams, Williams I, and McCutchan-McLaughlin) along the Fourche Maline Creek a temporal gap occurs between A.D. 1 and A.D. 600. Presently, there is little evidence for a similar hiatus in the Jackfork Valley. The dates at the Bug Hill site and five radiocarbon dates ranging between A.D. 243 and A.D. 616 obtained from other sites in the Clayton Lake project area argue against this type of hiatus.

#### *CADDOAN OCCUPATIONS*

A late prehistoric component is also indicated in Levels 1-2 (0-20 cm) and possibly extending to a depth of 30 cm (Strata Ip and I). This is based on the presence of ceramics such as Williams and LeFlore Plain (Varieties A-C); decorated grog, grit, and bone tempered ceramics (Varieties D-G); plain and decorated shell tempered ceramics (Varieties H-K); plain and decorated shale tempered pottery (Varieties L-N), and a Poole type ceramic pipe fragment (Category 57). Even though Williams Plain and LeFlore Plain ceramics are associated with earlier (Fourche Maline phase) components, they also are considered to be a utilitarian ware associated with the Spiro phase (Brown 1971). The other ceramic varieties, especially the decorated and shell tempered wares, suggest a late occupation correlating with the Harlan and Spiro phases. The Harlan phase is radiocarbon dated between A.D. 900-1200 (Bell 1972: 258) and the Spiro phase from A.D. 1200-1250 to A.D. 1300-1400 (Brown 1971: 220).

The small points (Categories 25-31) are commonly associated with these phases, and except for Scallorn points (Category 25) are confined predominantly to Levels 1-2 (0-20 cm). Eighty percent of these are small expanding stemmed/corner-notched points while small side-notched and straight stemmed points make up four and seven percent respectively. Similar patterns are evident in the Spiro and Harlan phases in the Arkansas River area (Brown 1976; Galm 1978a; 1978b) and Hochatown and Sanders phases in the Red River drainage. Large contracting stemmed points (Category 1) occur in similar late prehistoric contexts.

Additional artifact categories that are associated with this component occur in lesser frequencies, and many are also evident in earlier occupations of the Bug Hill site. These include large expanding stemmed/corner-notched points (Categories 2, 3, 4, 6, 8, 11, and 17), a large straight stemmed point (Category 19), the majority of the drills (Categories 32-34), scrapers (Category 35), bifaces (Categories 38-43), modified flakes (Categories 44-46), cores (Category 47), and split and tested cobbles (Categories 48-49). Ground and pecked stone items include manos (Categories 62-64), ground and modified hematite (Categories 68-69), a fragmentary gorget (Category 70), polished and ground sandstone and shale (Categories 71-72), and two pitted stones and two miscellaneous pecked stones (Categories 73-74). Bone artifacts are not as abundant in these levels, but include awls and pins (Categories 78-81), fish-hooks and debris (Categories 84-85), beamers (Category 86), spatulates (Category 87), miscellaneous worked bone (Category 98), and antler flakers (Category 100). There are no shell artifacts. The only features related to this component are rock concentrations (Features 79-1, 79-3, 79-30, and 79-32). Even though faunal remains are more fragmentary in these levels, most species are represented. Floral remains are also present, but molluscs are not as common. This is probably related to differential preservation.

A radiocarbon determination of A.D. 859  $\pm$ 60 (Beta-1410) may date this component. This date is from Level 3 (20-30 cm) in N26-E10, but there is also a stratigraphic date of A.D. 617  $\pm$ 80 (Beta-1409) from Level 2 (10-20 cm) in N50-E29. It is believed that the latter determination dates a slightly earlier occupation since this square, at the edge of the site, is approximately 40 cm lower than N26-E10.

#### *HISTORIC OCCUPATIONS*

The first arbitrary level (0-10 cm) is not dated, but it contains numerous artifact categories, especially historic remains. This level is also intensively disturbed through modern plowing. The historic remains (particularly ceramics, Categories 110-115) relate to a late 19th century occupation, possibly an early Choctaw occupation (C. Wallis, personal communication). Associated historic remains are present in Level 2 (10-20 cm) and a few in Level 3. These levels are correlated with Strata Ip and I. Level 2 is also part of the plowzone. Scattered pieces of historic material also occur in Level 4 and in Level 15, but these along with the material in Level 3 are believed to be the result of bioturbation.

In summary, several components are defined and a chronological sequence has been developed from the Bug Hill site which is closely related to similar developments in the Wiste Lake area (Galm 1978a; 1978b; Galm and Flynn 1978). The most recent component is a late historic Choctaw component. An early Caddoan occupation is related to the Harlan phase and dates to A.D. 854. The third component is associated with the Fourche Maline phase and dates between A.D. 279 and A.D. 617. The final component is affiliated with the Wister

phase and occurs between 1605 B.C. and 298 B.C. Approximately, 50 cm of the lower deposits at the site are undated.

## BURIALS

Eleven burials ranging between 46 cm and 110 cm below ground surface were recovered. One burial (F79-33) is associated with the Fourche Maline phase component and two burials (F79-31 and F79-36) are with the Wister phase component and have been dated at  $880 \pm 70$  B.C. and  $288 \pm 70$  B.C. respectively. The other burials occur in levels correlated to the Wister phase component. Their actual interment may have been higher, but may still be associated with the Wister phase. Very few burials intrude into the ash/clay concentrations at the site.

The majority of the burials are either infants or young children. Pathological conditions on a young infant (F79-33, Burial 8) suggest a pyogenic infection. Feature 79-36 (Burial 9) represents an adult female, 31-35 years of age with an estimated stature of 161 cm. This individual exhibited numerous pathologies with the most severe being a cavity in the left parietal which was well healed. Osteitis is also evident around the cavity. It is believed this was produced by a blunt, moderate trauma. This individual also exhibited a perforation of the right temporal region connecting the middle ear and cranial vault. This is believed to have caused an infection of the meningeal vessel which may have resulted in death. Maxillary abscesses are also evident and could be another cause of the meningeal infection. Another anomaly is cut marks on the styloid process. Genetic anomalies include partial sacralization of the fifth lumbar vertebrae, the absence of the right and left maxillary and left mandibular molars and the second maxillary incisors on both sides.

There is little evidence of social differentiation. Burial goods are generally absent except for shell pendants found with Burial 3 and bone beads with Burial 10. All the bodies are flexed and no trends are apparent in body position or orientation and head orientation. One burial (Burial 7) is a cremation and is secondarily interred. Several bone artifacts (engraved bone tubes, antler billets, and a split deer metapodial) were placed near the cremation after interment. The special attention paid this individual may reflect some type of social stratification.

The burials displaying pathological disorders or genetic anomalies suggest that similar processes as noted in skeletal populations in the Sam, Scott, and Wann sites along Fourche Maline Creek are present in the Bug Hill sample. The same may be said for head and body orientations, positioning of the body, and burial associations. However, several differences are also apparent. One burial at the Bug Hill site is a cremation which is secondarily interred. Cremations are rarely noted in sites along Fourche Maline Creek. The majority of burials at the

Bug Hill site are children while those at other sites are either adults or a combination of adults and children. At the Bug Hill site, this may represent sampling problems and should be tested in subsequent investigations. Finally, there is no evidence of violent death at the Bug Hill site. None of the burials have projectile points imbedded in bone or in the chest cavity.

#### LITHIC PROCUREMENT AND UTILIZATION

Bobalik (1977: 31-44) has developed a lithic reduction sequence for the Jackfork Valley, and the interested reader is referred to her report for a detailed discussion. Procurement and initial modification activities are reflected by split and tested cobbles (Categories 48-49) and cobble/quarried block biface I's (Category 40). Secondary modification activities are reflected by thin biface IIa's (Category 41) and thin biface IIb's (Category 42). The final activity set includes finished implements and/or maintenance and is characterized by finished bifacial chipped stone categories (1-32, 36, and 37). Much of the lithics is characterized by well rounded cortex suggestive of stream context, and the vast majority represent local resources. All stages of lithic reduction are present in each component.

Table 28 provides information about differences in the lithic reduction sequence during the various phases. It is evident that lithic procurement and maintenance are extremely similar during the Caddoan period and Fourche Maline phase. The Wister phase is characterized by placing slightly greater emphasis on primary and secondary modification as well as finished implements and/or maintenance. Overall, the minimal differences apparent in the lithic reduction model suggest that similar procurement and maintenance processes were conducted over time.

Table 28. Differences in lithic reduction through temporal periods.

Lithic Reduction Stage	Early Caddoan Period Levels 1-2	Fourche Maline Phase Levels 3-5	Wister Phase Levels 6-18
Procurement and Initial Modification	28	37	35
Primary Modification	68	71	104
Secondary Modification	30	47	63
Finished Implements	121	120	138

## FUNCTIONAL INTERPRETATIONS

Detailed microscopic analyses of chipped stone artifacts and other categories has not been conducted. In some cases, however, microscopic observations were made to check macroscopic observations. As a result, functional interpretations will be based mostly on artifact morphology and macroscopic observations. Similar analyses have been conducted throughout the Midwest and are believed to be fairly accurate (Winters 1969; McMillan 1971; House 1975: 55-74; Ahler and McMillan 1976).

### *CHIPPED STONE ASSEMBLAGE*

The small point categories could have been used as projectile point. This is based on their overall form, size, and weight (Fenenga 1953: 303-323; House 1975). Larger point categories could have served as projectile points, but may also have been used as hafted cutting or sawing tools (Ahler 1971). Ahler and McMillan (1976: 170) have suggested that the presence of transverse breaks and absence of impact fractures on large point categories are characteristic of hafted cutting tools.

Scrapers, drills, biface categories, modified flakes, hoes, and double-bitted axes may also be considered as generalized cutting, scraping, or sawing tools. Several drills made from projectile points and the double-bitted axe may have been hafted. The double-bitted axe, ground specular hematite, and basalt-like celt are believed to be heavy wood working implements. The chipped stone hoes may have been used as digging implements.

### *CERAMIC ASSEMBLAGE*

Pottery is associated with the early Caddoan and Fourche Maline phase components. The majority are plain, undecorated utilitarian wares which may have served as containers and for other domestic activities (Winters 1969). The decorated ceramic varieties may have had the same uses, but also could have had more specialized functions. The ceramic bead and pipe fragment are considered to be ceremonial or luxury items. Several Williams Plain basal sherds exhibit basketry impressions, and baskets may also have been used as domestic equipment.

### *GROUND AND PECKED/BATTERED STONE ASSEMBLAGES*

Most of the items in these categories are considered processing tools and probably reflect domestic equipment (Winters 1969: 61-64).

The manos, metate/grinding slab, and miscellaneous ground and pecked stone are believed to represent grinding/crushing, possibly of vegetal materials (Ahler and McMillan 1976: 195; House 1975: 72). Many manos and pitted stones are also characterized by having battered and crushed edges. They may have served as grinding/crushing implements for processing nuts, hematite, and breaking animal bones for marrow extraction. All of the pitted stones have U-shaped depressions and were probably used to crack nuts (Spears 1975: 83-116). As indicated earlier, the ground celts were probably used as wood working tools.

The single boatstone associated with the Fourche Maline phase is believed to have served as an atlatl weight (Bell 1980b: 46-47). The modified hematite as well as the unmodified hematite may have been used for obtaining pigment. The ground stone gorgets reflect variation in the sense that one has a zig-zag pattern on one side and two others have well defined serrated edges. These items are believed to have some social significance and are considered ceremonial or luxury items (Bell 1980b: 53).

#### *BONE ASSEMBLAGE*

The bone tools represent several different activities. The awls were used presumably to perforate or pierce soft materials such as leather or fabric. The pins may have had a similar use, but could also be personal adornment items. The fishhooks and fishhook debris are related to fishing. The bone and antler flakers and billets are presumed to have been used for percussion and pressure flaking. Two antler billets, bone tubes, and a split metapodial are burial associations (Burial 7). The function of the bone beamers, spatulates, and antler handles are uncertain. Three bone beads are associated with Burial 10. These as well as other beads may be considered personal adornment items. The canine and incisor pendants are also probably personal items, and some are associated with Burial 7. The worked rodent teeth may have a general purpose function, perhaps as parts of composite tools used for cutting. The functions of the engraved and cut bone is unknown but they be ceremonial items as is the decorated ulna. Fragments of worked antler and bone are very common and probably relate to many of the functions suggested above.

#### *SHELL ASSEMBLAGE*

A few shell tools are associated with the Fourche Maline phase component, but most occur in the Wister phase component. The majority are considered to be personal adornment and luxury items. A fresh water and a marine (conch) shell pendant are associated with Burial 3.

### *METAL ASSEMBLAGE*

One piece of copper from Level 6 (50-60 cm) represents the only prehistoric use of metal.

### *FAUNAL AND FLORAL ASSEMBLAGES*

The presence of large numbers of floral and faunal remains provide credence to many of the inferred functions listed above. The large amounts of unworked deer bone, turtle remains, and charred nutshell throughout the deposits at the Bug Hill site suggest that these were important food resources during all occupations. Charred nutshell and molluscan remains are not as abundant in the early Caddoan component. The greatest numbers seem to occur in the Late Archaic (Wister phase) component. Other faunal resources were also important such as rabbit and pocket gopher. The scarcity of elk, bison, and bear remains indicate that these species, even though present, were not as intensively utilized as deer for subsistence.

Environmental changes appear to have been nonexistent or minimal in nature. All of the faunal species are present in eastern Oklahoma today, except for elk, bison, and bear.

### *SITE FUNCTIONS AND NATURE OF SITE SIGNIFICANCE*

The primary activities throughout the site's history were the manufacture and maintenance of lithic implements and acquisition and processing of faunal and floral materials. There is not any major change in lithic reduction strategies and local resources were being utilized.

The earliest component dates between 1605 B.C. and 298 B.C. and is placed in the Late Archaic Wister phase. It may actually occur earlier or a Middle Archaic component may be present since the lower 50 cm of deposits are undated.

The Wister phase occupation represents a stable, intense, base camp type of occupation. All kinds of activities are suggested with floral and faunal exploitation being the most important. Various occupational surfaces have been defined. Whether these were occupied at the same time is unknown since intervening areas of the site were not excavated. Specific activities associated with this component do not vary greatly from those posited for later components, but several are intensified. In particular, activities associated with bone and stone tool manufacturing, maintenance, and use seem to be important.

Certain artifact types such as marine shell beads and pendants and most of the other shell items occur in this phase first. Also a copper tube found in Level 6 (50-60 cm) is associated with the latter part of the Wister phase.

The marine shell artifacts and possibly the copper are assumed to have been derived from the Gulf Coast area. This implies either direct contact with Late Archaic populations in the Gulf Coast area or trade through intermediaries. Unfortunately, there is very little evidence of marine shell objects in other Late Archaic sites. It is possible that Late Archaic sites along the coast of Texas have marine shell in association, but this information is unpublished. In central Texas, marine shell items have been identified in the San Marcos phase dating to 650 B.C. to ca. 350 B.C. (Prewitt 1981: 80).

The occupational surfaces, pits, postmolds, and the extremely dark sediments indicate that the Late Archaic occupation of the Bug Hill site was fairly intensive. This may not be true for the earlier part of the Late Archaic, but it seems to be the case for the major Archaic levels (60-110 cm).

At least 21 Archaic components have been identified in the Jackfork Valley, and the majority are considered to be late because of the prevalence of large contracting stemmed points (Bobalik 1977). Other than the Bug Hill site, only the Wheeler Lee site (34Pu-102) has been dated at 1727 B.C. and 1284 B.C. (Lintz 1982).

The Fourche Maline phase at the Bug Hill site is dated around A.D. 278 to A.D. 617, and also reflects hunting as a primary activity. Projectile points (small and large) argue for hunting as well as generalized cutting and sawing activities. These same activities are also suggested by other chipped stone categories. This component represents a base camp type occupation.

In addition to lithic manufacture and hunting, other activities include perforating, fishing, digging, storage or cooking, fire maintenance, vegetal procurement and processing, wood working, basketry making (as implied by basket impressions on pottery), a ceramic technology, and pressure and percussion flaking. There is also evidence for bone tool manufacture. Items such as the gorget fragment, modified hematite, marine shell pendants, marine shell beads, and cut and engraved bone suggest luxury type activities. One ash/clay concentration and one burial are part of this occupation. Also some rock concentrations may be associated, but they are better tied in with subsequent occupations.

Organic remains indicate that deer, turtle, and nut acquisition and processing was emphasized. Mussel shell frequencies indicate their importance as a food supplement.

There are numerous Woodland components in the Jackfork Valley, and several have been placed in the Fourche Maline phase. These include 34Pu-105, 34Pu-111, and 34Pu-100. Dates for these components are listed in Table 2. These dates correspond very closely with the dates reported for the Fourche Maline phase at the Bug Hill site. This, in conjunction with an emphasis on the use of local resources, implies a resident Woodland population in the Jackfork Valley. The marine shell pendant and beads indicates outside contact, perhaps trading. Marine shell gorgets are representative artifacts of the Twin Sisters phase (A.D. 200 to ca. A.D. 500) in Central Texas (Prewitt 1981: 81-82).

Even though the Fourche Maline phase component may represent a base camp type occupation, there is not much evidence that the site was occupied year round. If we accept the fact that nutshell, mussels, and deer are more easily acquired in the fall, then a late summer-fall occupation may be argued for. However, these resources may have been stored and utilized during other seasons as well.

Hunting is also the primary activity during the early Caddoan occupation of the site which dates around A.D. 859. Additional activities such as generalized cutting, scraping, perforating, digging, limited lithic manufacture, storage, cooking, vegetal procurement and processing, bone tool manufacture, and a ceramic technology are represented. The presence of rock concentrations in areas associated with levels assigned to the early Caddoan period suggest processing activities. The faunal and floral remains support these suggestions. However, the importance of mollusc utilization is questionable.

The light scattering of Caddoan materials and the generalized nature of activities indicate the site was used as a special purpose extraction camp during this time, even though more than one activity was being conducted.

Early Caddoan components have been identified at 22 (56%) sites in the Jackfork Valley. Caddoan components at two sites, 34Pu-74 and 34Pu-105, are suggested to represent base camp or even small hamlets (Lintz 1979b; Bobalik 1982). This suggests that Caddoan groups in the Jackfork Valley were resident populations returning to the Bug Hill site and other sites at different times of the year.

## VIII

### SUMMARY AND CONCLUSIONS

This report presents the results of excavations and subsequent analysis of material from the Bug Hill site (34Pu-116) which will be inundated upon completion of Clayton Lake. These investigations are part of the Phase II mitigation program developed by the U.S. Army Corps of Engineers, Tulsa District for Clayton Lake. The site was discovered in 1979 and excavations were completed by December 1979.

The site is north of Jackfork Creek near its confluence with North Jackfork Creek toward the west end of the project area. It is unique because it represents the southernmost distribution of dark, accretional mounds in eastern Oklahoma, it is one of three similar sites in the proposed lake area, and it is the only one excavated in the Jackfork Valley. Similar sites occur along various drainages (primarily Fourche Maline Creek) in Haskell, LeFlore, and Latimer counties. These include the Scott (Bell 1953; Galm and Flynn 1978), Wann (Sharrock 1960; Galm and Flynn 1978), Sam (Proctor 1957), Curtis Lake (Galm 1978b), Copeland (Guilinger 1971), and McCutchan-McLaughlin sites (Wyckoff 1976; Wyckoff and Woody 1977; Powell and Rogers 1980; Clark 1980). In addition, specialized studies concerned with physical anthropology of prehistoric populations have been conducted for the Sam and Wann sites (McWilliams 1970) and the McCutchan-McLaughlin site (Powell and Rogers 1980). Irvine (1980) has conducted an analysis of ceramics from the Williams I site, and Clark (1980) details the bone tool technology from McCutchan-McLaughlin. The data reported herein augments our knowledge of this type of site and provides additional information about prehistoric settlement patterns in Jackfork Valley.

The research design employed during the Clayton Archaeological Project was oriented to interpret settlement/subsistence patterns and an integration of these with adjacent areas. Specific aspects were to develop an adequate chronology and to determine the nature and type, significance, and function of site occupations. Because of the unique nature of the Bug Hill site, several site specific questions were also addressed. These involved: 1) the development of a chronological framework, and determining whether a chronological hiatus, particularly between A.D. 1 and A.D. 600 occurs; 2) the identification of archaeological units and understanding the kinds of change that may have occurred; 3) the determination of site occupations, i.e., whether

the occupations represent base camps, special purpose sites, or some other type of use; 4) determining whether evidence of climatic change is present, and what effect it may have had on prehistoric use of the site; and, 5) the relationship of human skeletal remains and whether these will reflect evidence of violence and pathological disorders as observed at Wister Valley sites.

Information obtained from the excavation and analysis of material indicates a long chronological sequence beginning as early as 1605 B.C. and extending to at least A.D. 845. During this period, three prehistoric cultural traditions are defined. The earliest and most intensive occupation is during the Late Archaic period. This has been assigned to the Wister phase. Radiocarbon determinations place this occupation between ca. 1605 B.C.-298 B.C. at the Bug Hill site. Subsequent use of the site between ca. A.D. 278-A.D. 617 occurs during the Woodland period and is assigned to the Fourche Maline phase. The primary difference between these occupations and the Wister phase are that the Fourche Maline phase is characterized by plain, grog, grit, and bone tempered ceramics (Williams Plain), a heavier utilization of contracting stemmed points over expanding stemmed corner-notched points, and during the latter part of this time period the use of small point varieties. The final prehistoric use of the site is associated with the early Caddoan period (ca. A.D. 859). Artifact similarities are more closely related to the Harlan and Spiro phases of the Arkansas River Valley. Historic use of the site is represented by ceramics and other historic material suggesting a late 19th century occupation. This may be related to Choctaw use of this area. Lintz (1979c: 57, Figure 5b; 65, Figure 6b) indicates that roads/trails during the early and late Choctaw settlement periods (1820-1907) traversed the general area south and east of the Bug Hill site.

The question of a cultural hiatus occurring between A.D. 1 and A.D. 600 does not seem to hold for the Jackfork Valley. Even though the Bug Hill site is the only excavated dark, accretional mound in the valley, two radiometric determinations fall within this general time period. The range of eight other dates from three sites in the Jackfork Valley is between A.D. 243-A.D. 616. This implies that this region was occupied during a substantial portion of the posited hiatus. It may well be that such a separation, confined to dark, accretional mounds, occurs in the Wister Lake area. However, this could be a sampling problem since very few non-mound sites in the Wister area have been dated or even excavated.

The site during the Wister and Fourche Maline phases represents base camp type occupations. This is based on the diversity of cultural remains; features such as ash/clay concentrations, pits, postmolds, and burials; and the intensity of activities. During the early Caddoan period the site seems to have been used as a special purpose type camp.

Even though similar activities are associated during all periods, the intensity of activities during the Wister and Fourche Maline phases appears to be greater than those associated with the early Caddoan period. Data such as a copper tube, bone beads, decorated bone, marine and freshwater shell beads and pendants, engraved gorgets, and so forth are restricted to the Wister and Fourche Maline phases. The marine shell items and probably the copper tube are indicative of trade or contact with groups more closely related to the Gulf Coast. Also the fact that several of these are associated with burials indicate they are luxury or special items rather than utilitarian objects.

As indicated above, similar activities are represented through time and the nature of site occupations appears to be relatively stable. The primary differences are the occurrence of marine shell in levels associated with the Wister and Fourche Maline phases. These phases are also characterized by larger projectile point styles with expanding stemmed corner-notched points dominating the Wister phase and large contracting stemmed points become predominant during latter periods. Ceramics and small point styles appear first during the Fourche Maline phase, but become more varied and, in the case of small points, more numerous during the early Caddoan period. Certain ground stone categories, boatstones, gorgets, and so forth are confined more to the Wister and Fourche Maline phases. With these exceptions, the overall cultural inventory and lithic procurement, manufacturing, and maintenance techniques are extremely similar. The trend is more toward additions to the cultural inventory rather than introduction of new techniques and innovations, and the primary economic adaptation represented at the site are believed to reflect a diffuse type of economy.

Human burials are another common trait at the site. For the most part, their placement in particular time periods is hampered by the lack of associated materials, the lack of definable burial pits, and dark, homogeneous sediments. Almost all are primary, flexed interments with no particular trend in body or head orientation. Another characteristic is that most burials in the central part of the site are young individuals. There is no evidence of violent death, but in several instances a generalized pyogenic infection seems to be the cause of death.

One burial (Feature 79-31, Burial 7), associated with the Wister phase, consists of the cremated remains of an adult. This is a secondary interment. In addition to charred canine pendants intermixed with calcined human bone fragments, several unburned grave goods are associated. These include antler billets, a split deer cannon bone, a contracting stemmed point, and bone tubes, one of which is engraved. Conch shell and freshwater mussel shell pendants are associated with a prenatal infant (Feature 79-19, Burial 3) and bifacial fragments, ground stone, and three bone beads are associated with the only multiple burial (Feature 79-38, Burial 10) from the site.

Pathological disorders are present on only two individuals. Osteitis is evident on the skull of Burial 8 (Feature 79-33). Burial 9 (Feature 79-36) is an adult female exhibiting a cavity and osteitis in the skull, a perforation of the right temporal, occlusal caries, and buccal and lingual apical abscesses. Genetic anomalies on this individual include the absence of secondary maxillary incisors and right maxillary and left mandibular third molars and partial sacralization of the fifth lumbar vertebrae. The small number of pathologies may be attributable to the relatively large number of young individuals constituting the sample.

Comparison of these individuals with burials from Wister Valley sites reveal several differences. At the Bug Hill site, primarily young individuals are represented, very few pathologies are evident, there is no evidence of violent death, and multiple burials are scarce. There is also very little evidence of cremations in the Wister Valley area. Similarities include an absence of burial goods, flexed burials with no particular body or head orientation, primary inhumations with little attention paid to sex and age, and a general lack of burial pits.

Faunal and floral remains at the Bug Hill site (as well as sites in the Wister Valley) are similar through time. Large amounts of unworked deer bone, turtle, and charred nutshell suggest they were important food resources during all periods. Rabbit and pocket gopher were also important faunal resources. Aquatic resources, especially molluscs, seem to be more important during the Wister and Fourche Maline phases, but evidence of fishing also occurs during early Caddoan use of the site.

The similarity of faunal and floral remains suggest a relatively stable environment throughout the site's occupation. Identified gastropod species reflect moist, wooded environments. An increase in some gastropod species is evident in Levels 9 and 10 (80-100 cm), but this is attributable to the fact that certain gastropods may have been attracted to human refuse. Molluscan remains also do not represent any variation from those presently found in the Kiamichi River and its tributaries.

In summary, the closest similarity of the Bug Hill site is to sites in the Wister Lake area. This is not only in terms of artifact assemblages but also in radiocarbon dates and intense occupational sequences. At the Scott site, the earliest occupation is during the Middle Archaic ranging from 2550 B.C. to 1550 B.C. Late Archaic occupations are associated with the Wister phase which falls between 1550 B.C. and 200 B.C. or A.D. 1. The earliest ceramic phase is the Fourche Maline phase which may begin as early as 200 B.C. or A.D. 1 and lasts until A.D. 800-1000. Finally, an early Caddoan occupation is present in the upper levels of most sites (Galm and Flynn 1978: 154-157). Dates from the Curtis Lake, McCutchan-McLaughlin, Wann, and Williams I sites confirm this general sequence.

Based on information from the Bug Hill site, a similar picture may be drawn for the Jackfork Valley. The earliest occupation of the site occurs before 1605 B.C. A date of 1727-1248 B.C. from the nearby Wheeler Lee site (34Pu-102) confirms this. The date of 1605 B.C. at the Bug Hill site is presently associated with the Wister phase which lasts until 283 B.C. or later. The earliest date for the Fourche Maline phase, characterized by the first occurrence of ceramics, is A.D. 278 and lasts until A.D. 617. Additional evidence of this phase is present at several other sites in the Jackfork Valley which range in time from around A.D. 300 to A.D. 670. The final prehistoric occupation is associated with the early Caddoan period and is dated at A.D. 859. Again, several sites in the Jackfork Valley have dated early Caddoan components ranging from A.D. 1013 to A.D. 1221.

There are several sites in Arkansas within the Little River region which may be related to the Fourche Maline phase. These are undated, but are estimated to range between A.D. 300 to A.D. 850 (Hoffman 1970: 155-156). The most obvious difference is that the Arkansas sites have a sandy paste pottery and shallow, extended burials. These same traits in the Fourche Maline phase in eastern Oklahoma are grog, grit, and bone tempered ceramics and flexed burials.

In a broader perspective, many Fourche Maline and Wister phase artifact styles are similar to artifacts associated with Middle and Late Archaic complexes in the central part of the eastern United States. This probably indicates closely related adaptations to similar environmental zones.

In conclusion, the investigations conducted at the Bug Hill site provide additional information regarding settlement/subsistence patterns in the Jackfork Valley and in eastern Oklahoma. However, before an adequate settlement/subsistence model can be developed, it will be necessary to obtain information about past environments and to understand prehistoric utilization of areas other than stream valleys. Our investigations have raised more questions about this type of site than they have answered, but it is hoped that this report will enhance future scientific investigations of similar sites.

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## APPENDIX

### SELECTED ARTIFACT MEASUREMENTS

Table A. Metric attributes in mm for selected chipped stone categories.

ARTIFACT CATEGORY	LENGTH	WIDTH	THICKNESS	STEM LENGTH	STEM WIDTH
1					
$\bar{x}$	51.0	27.2	7.5	16.9	16.2
s.d.	10.7	6.5	1.7	3.8	4.1
range	25.9-75.5	13.7-42.8	4.2-15.6	8.9-26.7	9.0-30.0
N	90	166	185	174	185
2					
$\bar{x}$	47.1	26.5	7.7	11.1	16.4
s.d.	9.7	4.5	1.3	1.9	1.9
range	35.0-54.8	21.1-33.3	5.9-9.0	8.4-15.3	13.9-20.4
N	5	8	10	10	10
3					
$\bar{x}$	47.0	23.3	6.6	8.8	18.4
s.d.	0.6	3.9	1.0	2.1	3.2
range	46.6-47.4	17.4-27.8	5.3-7.9	6.5-12.1	14.5-22.3
N	2	5	5	5	4
4					
$\bar{x}$	44.3	25.2	6.0	8.7	15.6
s.d.	7.7	3.1	0.5	2.3	3.2
range	36.3-51.6	21.8-29.0	5.3-6.5	5.4-11.0	10.7-17.4
N	3	5	5	5	4
5					
$\bar{x}$	41.0	30.5	7.4	11.5	18.2
s.d.	5.6	4.3	0.8	0.9	2.8
range	33.5-47.1	27.0-39.0	6.6-8.4	10.0-12.4	15.1-22.1
N	4	6	6	6	6
6					
$\bar{x}$	49.6	28.5	6.8	10.8	18.2
s.d.	6.8	3.0	1.0	1.9	2.8
range	35.9-60.6	23.4-33.8	4.1-8.3	6.1-13.4	13.0-24.3
N	16	16	20	20	19
7					
$\bar{x}$	50.0	32.9	7.1	10.7	17.3
s.d.	8.3	5.2	0.7	2.3	4.1
range	44.6-59.6	26.5-40.8	6.0-8.1	7.7-14.8	9.0-23.0
N	3	5	9	9	9

Table A Continued

ARTIFACT CATEGORY	LENGTH	WIDTH	THICKNESS	STEM LENGTH	STEM WIDTH
8					
$\bar{x}$	51.2	33.8	7.2	10.7	19.0
s.d.	6.9	4.3	1.1	3.0	3.4
range	39.6-63.4	29.3-42.6	5.4-9.5	7.4-18.5	14.9-27.1
N	8	10	13	13	11
9					
$\bar{x}$	-	24.0	6.7	10.7	15.0
s.d.	-	2.6	1.3	2.2	3.7
range	-	20.3-27.6	5.0-8.4	8.8-14.2	9.7-18.8
N	-	5	5	5	5
10					
$\bar{x}$	43.6	34.8	6.5	10.0	25.9
s.d.	-	7.9	0.8	0.6	9.1
range	-	29.2-40.3	5.9-7.0	9.6-10.4	19.5-32.3
N	1	2	2	2	2
11					
$\bar{x}$	37.4	29.4	6.8	13.5	20.5
s.d.	-	4.2	0.9	2.5	2.9
range	-	22.1-36.2	5.2-8.1	11.4-18.1	18.4-27.5
N	1	8	8	8	8
12					
$\bar{x}$	52.5	40.4	6.9	8.1	19.1
s.d.	-	6.4	0.9	1.2	3.0
range	-	33.4-49.8	5.7-8.0	6.5-9.5	14.1-22.0
N	1	5	6	6	6
13					
$\bar{x}$	42.6	34.3	6.5	8.9	17.1
s.d.	2.2	4.9	1.4	2.3	2.2
range	41.0-44.1	30.8-37.7	5.5-7.5	7.2-10.5	15.5-18.6
N	2	2	2	2	2
14					
$\bar{x}$	71.7	24.2	8.6	15.0	18.9
N	1	1	1	1	1

Table A Continued

ARTIFACT CATEGORY	LENGTH	WIDTH	THICKNESS	STEM LENGTH	STEM WIDTH
15					
$\bar{x}$	52.9	29.6	6.7	7.7	16.3
s.d.	3.2	3.4	0.9	0.7	0.5
range	50.6-55.1	27.7-32.0	6.1-7.3	7.2-8.2	15.9-16.6
N	2	2	2	2	2
16					
$\bar{x}$	-	30.2	7.0	10.4	16.0
s.d.	-	3.9	1.2	1.8	3.4
range	-	27.3-35.6	6.1-8.7	9.3-13.0	11.8-19.9
N	-	4	4	4	4
17					
$\bar{x}$	36.8	22.5	6.5	9.8	13.9
s.d.	7.9	4.3	1.5	2.1	2.3
range	30.6-48.6	15.8-27.9	4.9-9.5	6.2-13.4	11.2-16.9
18					
$\bar{x}$	69.7	26.5	6.6	14.4	14.9
N	1	1	1	1	1
19					
$\bar{x}$	48.5	25.6	8.0	14.8	14.2
s.d.	-	4.1	1.1	1.4	1.7
range	-	20.2-30.2	6.9-9.1	12.9-16.0	12.5-15.8
20					
$\bar{x}$	40.8	36.3	5.7	8.4	16.3
N	1	1	1	1	1
21					
$\bar{x}$	-	27.6	9.7	19.2	16.3
N	-	1	1	1	1
22					
$\bar{x}$	51.8	30.4	10.5	16.5	17.5
s.d.	17.3	4.4	1.6	4.0	3.8
range	39.6-64.0	24.9-34.8	8.6-12.5	11.5-21.1	12.0-20.7
N	2	4	4	4	4

Table A Continued

ARTIFACT CATEGORY	LENGTH	WIDTH	THICKNESS	STEM LENGTH	STEM WIDTH
23					
$\bar{x}$	58.0	28.3	9.6	20.3	16.8
N	1	1	1	1	1
24					
$\bar{x}$	70.5	29.5	7.6	9.1	16.1
s.d.	12.0	4.0	0.6	1.3	2.2
range	62.4-84.2	26.7-32.3	7.0-8.5	7.4-10.5	14.5-19.2
N	3	2	4	4	4
25					
$\bar{x}$	23.7	13.2	3.5	5.9	9.1
s.d.	7.8	6.5	0.9	1.2	2.1
range	15.2-43.4	4.0-20.4	2.0-5.4	3.8-10.6	4.2-13.4
N	25	42	44	40	28
26					
$\bar{x}$	16.1	12.2	3.3	4.1	6.0
s.d.	3.9	0.4	0.2	0.5	0.7
range	13.3-18.8	12.0-12.6	3.1-3.5	3.5-4.8	5.3-6.6
N	2	3	4	4	3
27					
$\bar{x}$	20.0	10.5	4.2	4.9	11.4
s.d.	1.6	1.7	2.1	1.1	4.2
range	18.1-21.6	8.5-13.1	1.8-4.4	3.0-6.1	7.5-16.3
N	4	7	7	6	5
28					
$\bar{x}$	24.6	-	4.2	10.7	-
N	1	-	1	1	-
29					
$\bar{x}$	21.6	-	5.0	-	-
N	1	-	1	-	-
30					
$\bar{x}$	21.2	11.1	2.9	4.9	9.9
s.d.	7.9	0.9	0.2	1.5	0.6
range	15.6-26.8	10.5-11.7	2.7-3.0	3.8-5.9	9.4-10.3
N	2	2	2	2	2

Table A Continued

ARTIFACT CATEGORY	LENGTH	WIDTH	THICKNESS	STEM LENGTH	STEM WIDTH
31					
$\bar{x}$	23.6	15.1	3.7	4.7	5.7
s.d.	3.4	2.1	1.2	1.1	0.8
range	19.7-27.2	12.5-17.4	2.6-5.3	3.2-6.1	5.0-6.7
N	4	5	5	5	5
32					
$\bar{x}$	35.0	24.5	6.3	-	-
s.d.	2.8	6.2	1.1	-	-
range	30.9-37.1	15.1-31.2	5.0-7.5	-	-
N	4	5	5	-	-
33					
$\bar{x}$	34.6	20.1	4.9	-	-
s.d.	10.0	4.8	1.1	-	-
range	20.5-48.8	15.2-26.8	3.1-5.9	-	-
N	7	6	8	-	-
34					
$\bar{x}$	35.9	14.0	4.5	-	-
s.d.	5.7	1.6	0.6	-	-
range	31.8-39.9	12.2-15.1	3.9-4.9	-	-
N	2	3	3	-	-
35					
$\bar{x}$	55.3	45.1	22.5	-	-
s.d.	18.4	15.9	7.8	-	-
range	27.5-86.2	14.1-67.4	7.4-36.2	-	-
N	14	14	14	-	-
36					
$\bar{x}$	132.5	70.4	30.4	-	-
N	1	1	1	-	-
37					
$\bar{x}$	-	60.1	22.3	-	-
s.d.	-	4.8	2.8	-	-
range	-	56.7-63.5	20.3-24.3	-	-
N	-	2	2	-	-

Table A Continued

ARTIFACT CATEGORY	LENGTH	WIDTH	THICKNESS	STEM LENGTH	STEM WIDTH
38					
$\bar{x}$	63.8	51.2	33.8	-	-
s.d.	19.1	15.4	13.5	-	-
range	37.4-121.3	23.0-93.0	14.5-93.5	-	-
N	40	40	40	-	-
39					
$\bar{x}$	54.8	41.0	21.5	-	-
s.d.	12.5	11.4	10.5	-	-
range	30.6-93.8	19.9-106.3	8.6-37.2	-	-
N	143	153	159	-	-
40					
$\bar{x}$	56.3	39.0	16.0	-	-
s.d.	12.9	8.9	4.3	-	-
range	33.7-82.1	18.6-58.6	5.2-25.7	-	-
N	96	100	102	-	-
41					
$\bar{x}$	48.5	29.9	8.3	-	-
s.d.	14.4	9.6	2.5	-	-
range	25.2-92.8	13.6-58.5	2.5-14.9	-	-
N	64	92	96	-	-
42					
$\bar{x}$	51.2	29.5	8.9	-	-
s.d.	11.6	9.1	2.9	-	-
range	27.6-71.6	8.4-53.3	4.0-14.5	-	-
N	27	46	47	-	-
47					
$\bar{x}$	49.2	42.6	31.6	-	-
s.d.	17.3	15.5	12.1	-	-
range	32.3-70.9	27.5-63.3	13.7-44.2	-	-
N	5	5	5	-	-
48					
$\bar{x}$	66.7	52.5	25.5	-	-
s.d.	15.7	13.6	8.5	-	-
range	46.3-98.8	37.5-99.7	16.1-39.4	-	-
N	20	20	20	-	-

Table A Continued

ARTIFACT CATEGORY	LENGTH	WIDTH	THICKNESS	STEM LENGTH	STEM WIDTH
49					
$\bar{x}$	75.1	55.1	35.0	-	-
s.d.	24.2	20.7	11.4	-	-
range	39.0-138.0	25.9-116.8	15.6-61.8	-	-
N	45	45	45	-	-

Table B. Metric attributes in mm for selected ground and pecked stone categories.

ARTIFACT CATEGORY	LENGTH	WIDTH	THICKNESS
62			
$\bar{x}$	105.9	86.2	47.6
s.d.	28.6	19.7	8.4
range	73.5-127.4	60.8-127.6	36.8-68.0
N	3	10	14
63			
$\bar{x}$	110.5	83.9	43.9
s.d.	12.8	10.9	10.8
range	97.6-122.8	65.0-101.2	15.4-62.8
N	4	16	22
64			
$\bar{x}$	84.0	89.6	42.5
s.d.	18.9	9.3	7.0
range	59.0-114.0	70.6-102.2	31.8-54.1
N	10	13	14
65			
$\bar{x}$	-	295.5	50.8
s.d.	-	-	29.6
range	-	-	30.8-102.4
N	-	1	5
66			
$\bar{x}$	70.9	47.1	29.4
s.d.	-	2.2	10.0
range	-	45.5-48.6	22.3-36.4
N	1	2	2
67			
$\bar{x}$	33.2	48.0	18.2
N	1	1	1
68			
$\bar{x}$	-	40.1	16.5
s.d.	-	5.2	0.7
range	-	36.4-43.8	16.0-17.0
N	-	2	2

Table B Continued

ARTIFACT CATEGORY	LENGTH	WIDTH	THICKNESS
73			
$\bar{x}$	90.8	74.9	48.6
s.d.	20.8	17.0	13.4
range	51.3-150.0	55.0-143.9	25.8-107.4
N	26	33	37
74			
$\bar{x}$	97.2	72.5	53.4
s.d.	31.5	8.0	12.0
range	74.9-119.4	62.8-84.2	40.1-79.4
N	2	6	11